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Subsistence Salmon Harvests in the Kuskokwim Area, 2008 and 2009

Final Report for Study 08-352

USFWS Office of Subsistence Management

Fisheries Resource Monitoring Program

by

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Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) in partnership with Orutsararmiut Native Council (ONC) in Bethel and Kuskokwim Native Association (KNA) in Aniak has utilized a voluntary survey program to estimate salmon harvest for the Kuskokwim Area. Harvest information was collected through postseason household interviews and harvest calendars. Simple random sampling, stratified random sampling and 100% census techniques were used to select households to be interviewed, based on community size and user group designations. For the community of Bethel, subsistence salmon harvest information was collected by ONC. Subsistence salmon harvest information was collected by KNA in Aniak, and ADF&G surveyed the remaining communities in the Kuskokwim Area. Data from surveyed households were expanded to estimate the harvest of un-surveyed households when historical data for that community existed. In 2008, 992 households were surveyed in 23 communities in the Kuskokwim Area, including Kongiganak in North Kuskokwim Bay, communities along the Kuskokwim River, and the communities of South Kuskokwim Bay. Salmon harvest estimates for 2008 were: 103,713 Chinook; 71,649 chum; 64,183 sockeye; 52,742 coho; and 1,342 pink salmon. In 2009 1,699 households were surveyed in 27 communities. Salmon harvests for the same area in 2009 were: 82,100 Chinook; 45,199 chum; 37,971 sockeye; and 32,090 coho, and 563 pink salmon.

Key words subsistence, Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, and coho *O. kisutch*, salmon, harvest, Bethel, Aniak, Kuskokwim River, postseason harvest surveys.

INTRODUCTION

The purpose of this study is to conduct postseason subsistence harvest surveys in the Kuskokwim Management Area. The current study years, 2008 and 2009, address changes in objectives and survey methodology implemented by the Division of Commercial Fisheries for the overall *Kuskokwim Subsistence Salmon Monitoring Program* (Monitoring Program). This study is a continuation of the Monitoring Program, incorporating these changes in methodology. The Monitoring Program collects data about the number and species of salmon harvested by area residents. These data are then analyzed to provide an estimate of the number of salmon harvested for subsistence purposes in the Kuskokwim Area.

The Kuskokwim Area (Figure 1) subsistence salmon fishery is one of the largest in the state in terms of the number of residents who participate and the number of salmon harvested (Fall et al. 2009). Alaska Department of Fish and Game (ADF&G) Division of Subsistence studies in the region indicate that fish contribute as much as 85% of the total pounds of fish and wildlife harvested in a community, and salmon contribute as much as 53% of the total annual harvest of fish and wildlife for subsistence (ADF&G 2011). In addition to other fish species, residents of the Kuskokwim Area harvest all 5 locally occurring species of Pacific salmon for subsistence purposes: Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, coho *O. kisutch*, pink *O. gorbuscha*, and sockeye *O. nerka* salmon. Drift gillnetting, set gillnetting, and rod and reel fishing are the primary methods used when harvesting salmon.

From June through October, the movement of families from permanent winter residences to summer fish camps situated along tributary and mainstem rivers and sloughs continues to be very important in annual subsistence harvest efforts. During these months, daily activities of many Kuskokwim Area households revolve around subsistence fishing activities. Subsistence salmon harvest practices represent a complicated dynamic between culture, tradition, salmon biology, and local economy (Simon et al. 2007; Patton and Carroll *In prep*). This report is a quantitative analysis of data collected during the house-to-house harvest surveys describing the 2008 and 2009 fishing seasons in the Kuskokwim Area.

Since 1960 the Monitoring Program has estimated salmon harvest primarily through household surveys, and to a lesser extent harvest calendars and post card surveys. This information has been used by ADF&G, U.S. Fish and Wildlife Service (USFWS), the Alaska Board of Fisheries (BOF), and the Federal Subsistence Board to manage customary and traditional uses of salmon and to provide a reasonable opportunity for continued customary and traditional uses of salmon throughout the region. In 2001, the BOF found that the following amounts of fish were reasonably necessary for subsistence (ANS) in the Kuskokwim River drainage: 64,500 to 83,000 Chinook salmon; 39,500 to 75,500 chum salmon; 27,500 to 39,500 sockeye salmon; and 24,500 to 35,000 coho salmon (5 AAC 01.286.b). A species-specific ANS range provides an index of the extent to which reasonable opportunity was provided in each subsistence fishery. Harvests below the lower bound of the ANS range may indicate, with other evidence, that there was not a reasonable opportunity for subsistence harvests during the fishing season. Harvests consistently lower than the lower bound of the ANS are an indication to the BOF to consider whether additional management actions are necessary to provide reasonable subsistence harvest opportunities. At present, subsistence fishermen are not required to report their harvest to ADF&G or to any federal management agencies, and licenses and permits are not required for participation in the subsistence fishery. With only a few exceptions for special management areas (e.g., Aniak River), there are no subsistence harvest or bag limits throughout much of the Kuskokwim Management Area. Legal subsistence fishing gear includes gillnets (which are most common), beach seine, rod and reel, fish wheel, and spear (5 AAC 01.270). The mesh size used for drift and set gillnets are not regulated, but aggregate length of gillnets and depth is restricted by regulation.

Annual documentation of the subsistence salmon harvest is necessary to determine if sufficient salmon are returning to the Kuskokwim Area for escapement and subsistence requirements. The primary method of estimating this harvest is the annual subsistence salmon harvest survey described in this report. This report also details aspects of the operational plan as 2008 and 2009 has been a transitional time and it is important that methods and implementation of methods and protocols be transparent.

RECENT PATTERNS OF SUBSISTENCE HARVEST

The significance of salmon harvests and uses for subsistence in the Kuskokwim area is well documented by ADF&G studies. They indicate that salmon contribute as much as 53% of the total pounds of fish and wildlife harvested in a community (ADF&G 2011). The harvest of salmon for subsistence has ranged from 241 lbs usable weight per capita (e.g., Nunapitchuk, 1983) to 649 lbs (e.g., Akiachak, 1998) per capita.

There are 38 communities in the Kuskokwim Area (Table 1; Figure 1). In 2007, there were approximately 4,600 households in these 38 communities. It should be noted that the Monitoring Program effort in 2007 was reduced compared to previous efforts and produced minimum harvest estimates. Most subsistence salmon harvest occurred in the lower Kuskokwim River, which in 2007 comprised 63% of the total Kuskokwim Area households (Fall et al. 2009). For example, in 2007 the harvest in communities from Eek to Tuluksak (Figure 1) of the lower Kuskokwim River was 62,721 Chinook; 44,887 chum; 29,567 sockeye; and 21,359 coho salmon. The majority of the subsistence salmon harvest in the lower river was in Bethel which is the largest community in the region, consisting of approximately 1,800 households in 2007.

In the Middle Kuskokwim River area, comprising 7% of the Kuskokwim Area households in communities from Lower Kalskag to Chuathbaluk, the harvest in 2007 was 4,334 Chinook; 5,070 chum; 1,653 sockeye; and 2,927 coho salmon. The majority of subsistence salmon harvest in the middle Kuskokwim River was in the community of Aniak, with 161 households. In the upper Kuskokwim River area, comprising 6% of the Kuskokwim Area households in communities from Crooked Creek to Nikolai, the harvest in 2007 was 1,590 Chinook salmon; 1,351 chum salmon; 2,014 sockeye salmon; and 821 coho salmon (Fall et al. 2009).

The north Kuskokwim Bay communities of Kwigillingok, Kongiganak, and Kipnuk comprised 8% of the Kuskokwim Area households in 2007 (Fall et al. 2009). These communities are not located on the Kuskokwim River, but many subsistence salmon fishing households from these communities have travelled to the Kuskokwim River to fish, in addition to fishing in areas closer to their communities. Of these north Kuskokwim Bay communities, only the community of Kongiganak (92 households in 2007) has participated in the voluntary harvest survey (Simon et al. 2007); however, Kongiganak was not surveyed in 2007.

The communities of Quinhagak, Goodnews Bay, and Platinum, located in south Kuskokwim Bay, comprised 5% of the Kuskokwim Area households in 2007. Subsistence fishermen from these communities harvested salmon primarily from the Kanektok, Arolik, and Goodnews River drainages (Simon et al. 2007). The 2007 subsistence harvest in this area was 3,436 Chinook salmon; 1,732 chum salmon; 1,339 sockeye salmon; and 1,163 coho salmon (Fall et al. 2009).

The Bering Sea coastal communities of Mekoryuk (on Nunivak Island), Newtok, Tununak, Toksook Bay, Nightmute, and Chefornak comprised 11% of Kuskokwim Area households in 2007 (Fall et al. 2009). Subsistence users from these communities harvested salmon from coastal waters as well as area tributaries (Simon et al. 2007). These communities have chosen not to participate in the study for most years; therefore, the subsistence salmon harvest for this area has not been consistently estimated.

For the Kuskokwim Management Area, in 2007 the estimated total harvest of salmon for subsistence was 186,243 fish, a decrease of 9% from 2006 when the total estimated harvest was 204,510 salmon, and a 7% decrease from the recent 5-year average harvest, 201,261 salmon (Fall et al. 2009). As noted above, 2007 produced minimum estimates of the salmon harvest and therefore harvest estimates from 2002 to 2006 are included here to represent the harvest of salmon for subsistence in the Kuskokwim Area. For the recent 5-year period 2002–2006, the average annual estimated harvest was 73,603 Chinook; 36,405 sockeye; 36,434 coho; and 54,550 chum salmon.

HISTORY OF SUBSISTENCE SALMON HARVEST STUDIES

The Division of Commercial Fisheries began conducting subsistence salmon harvest surveys among Kuskokwim River fishermen in the early 1960s (Simon et al. 2007); surveys were subsequently broadened to include the southern Kuskokwim Bay communities of Quinhagak in 1967 and Goodnews Bay and Platinum in 1979. The Division of Commercial Fisheries first developed harvest estimates through "smokehouse counts" conducted immediately following the Chinook salmon run (e.g., Jonrowe et al. 1979). Communities and fish camps from Eek to Swift River were visited (Regnart et al. 1970). Prior to 1985, subsistence salmon catches were lumped into one of two categories: "king salmon" and "small salmon" (e.g., Walker and Coffing 1993). During 1983, 1984, 1986, and 1987, funding was insufficient to conduct surveys in all Kuskokwim Area communities; instead, subsets of communities were sampled and then these

data were expanded to produce an estimate of the salmon harvests by other Kuskokwim area communities. Therefore, while subsistence salmon harvest information from 1960 to 1988 is available, the data are not necessarily comparable from year to year (Andrews and Coffing 1986; Walker and Coffing 1993).

The Division of Subsistence assumed responsibility for the Monitoring Program in 1988 and collected and analyzed the data through 2007. Survey methods were refined during the 1988 field season through the development of a comprehensive community household database, as described in Francisco et al. (1989). Subsistence salmon harvests were estimated based on the total number of households in a community. Not only were households that "usually fish" tracked on an annual basis, but households that "usually do not fish" were also sampled during postseason harvest monitoring activities. This stratified method of estimating total community harvests resulted in more complete data for all salmon species harvested for most communities in the Kuskokwim Area (Simon et al. 2007).

In 1989 the postseason survey was refined further to produce more accurate estimates of the total number of the different salmon species harvested for subsistence uses (Francisco et al. 1990; Walker and Coffing 1993). The timing of the postseason household surveys shifted from July and August to October and November, after the coho salmon run. Divisions of Subsistence and Commercial Fisheries determined that the later survey timing was necessary to get more complete catch data, particularly on coho salmon (Francisco et al. 1990).

For most years, the household harvest survey goal was 28 of 38 communities, as funding allowed. The remaining communities were normally contacted via mailed-in harvest calendar. Postcards were sent to households unable to be contacted. Beginning in 2006, calendars were mailed to all area residents previously identified as "usually fish," or who reported fishing the previous year. Also in 2006, the survey instrument was updated by combining the previously-used 4 separate instruments (one each utilized in the lower and middle river, upper river, Bering Sea Coast, and Bethel).

In Bethel before 2005, a census survey was attempted every year. Each household was assigned to a stratum, "usually fish" or "usually do not fish," according to previous year's results. In 2005, the Bethel methodology was redesigned. The sampling method changed from a stratified census survey to a random sample approach to reduce sampling error (Krauthoefer 2005). In addition, harvest calendars were sent to all post office box holders in Bethel. Unlike other communities, Bethel households were no longer tracked from year to year by household name.

In 2007, the Division of Subsistence ran an abbreviated program with limited funding. In 2008 the Division of Commercial Fisheries reestablished its supervision of the program in the Kuskokwim Area in order to continue the collection of this information that is important for managing the subsistence as well as commercial and sport salmon fisheries. A harvest monitoring program on the Yukon River drainage has been conducted since 1961, and many of the training techniques, data entry practices, survey instruments, and other program materials used on the Yukon were tailored for use in the Kuskokwim Area. The program also incorporated historical subsistence household information collected by Subsistence and Commercial Fisheries divisions for more than two decades to create the "families database." The harvest Monitoring Program has partnered with Orutsararmiut Native Council (ONC) in Bethel since 1999 and with the Kuskokwim Native Association (KNA) in Aniak since 2002.

METHODS

The primary objective of the Monitoring Program in 2008 and 2009, the focus of this report, was to estimate total subsistence salmon harvests on a drainagewide basis. As mentioned previously, the 2008 and 2009 years were a transitional period, and changes were made to survey methodologies. Survey methods that were used in 2007 are documented in Fall et al. (2009). The sampling design of the current postseason subsistence monitoring program has changed from methods used by the Division of Subsistence before 2008 and Hamazaki (2011) gives a thorough discussion of this transition to new methodologies. A thorough comparison of survey results obtained using the former (Division of Subsistence) and updated methodologies showed that harvest estimates and precision levels were comparable. This analysis demonstrated that the reduced survey coverage of 25–40% of all households is sufficient for accurate and precise estimation of the Kuskokwim subsistence salmon harvests (Hamazaki 2011 and Appendix J1).

STUDY DESIGN

Subsistence salmon harvest by Bethel residents was estimated by employing a simple random survey method. As the main hub city of Western Alaska, the population of Bethel is highly fluid; a high proportion of the population moves in and out of Bethel on a regular basis (Krauthoefer 2005). Additionally, people often change dwellings. This makes it difficult to maintain an accurate and complete household list. Instead, we used a dwelling list ground-truthed against the Bethel city planner's office and fire department occupant dwellings map and list. This list was updated each season, and based on the updated list, 50% of occupant dwellings were randomly selected for survey.

ADF&G was responsible for designing the survey instrument, providing an updated dwelling list, and selecting survey households; ONC was responsible for conducting the household surveys. Before the harvest survey, ADF&G provided survey forms (Figure 2), and trained ONC technicians about the project and proper application of the survey instrument. Beginning in October, ONC technicians conducted the household harvest survey in Bethel and returned completed forms to ADF&G.

Because KNA has the resources to survey all households, subsistence salmon harvest by Aniak residents was estimated using a census (100% survey) method. Compared to Bethel, Aniak is small and there are fewer household changes annually (Krauthoefer 2005). This makes it possible to maintain household lists. In this method, households were not stratified into the 3 user-types: "usually fish," "usually do not fish," and "unknown." Instead, an attempt to survey all houses was made, and then the average harvest/household was used to expand for any unsurveyed households to create the total harvest estimate for each salmon species.

Before the harvest survey, ADF&G instructed KNA technicians about the project and trained them in the proper application of the survey instrument. ADF&G generated the household list and provided the survey forms (Figure 2). Beginning in October, KNA technicians conducted the household harvest survey and returned completed forms to ADF&G.

For the remaining 27 communities in the Kuskokwim Area, the annual subsistence harvest survey was conducted by the ADF&G staff, as either a census or stratified sampling survey, depending on community size. In the stratified random survey method, households were stratified by 3 user-types: "usually fish," "usually do not fish," and "unknown." Assignment of households to strata was based on previous surveys. Households previously identified as

"usually fish" or who reported fishing the previous year were assigned to "usually fish", and those previously identified as "usually do not fish" or did not harvest for the past 3 years were assigned to "usually do not fish." New households or those that had not been surveyed previously were assigned to "unknown."

Before conducting surveys, a community household list was created using the previous year's data. These data included new and changed households, but did not include houses that moved or were marked for deletion in the previous year. In 2008, extra effort was put forth to send household lists to local tribal or city government offices to verify the number of households. The survey crew contacted community officials to notify them about the project before arriving in the community to conduct surveys. The household lists were then further detailed and corrected as the surveyors completed the survey process in the community. Communities were prioritized based on transportation scheduling, staff time, need for survey effort, and their consent to participate in the program. All collected survey data was entered into the ADF&G subsistence harvest database, and harvest estimates were generated for the Kuskokwim Area.

All subsistence harvest data was treated as confidential information, such that all household harvest data were reported anonymously, and at the community level. The study was generally conducted in accordance with the Alaska Federation of Natives' "Guidelines for Research" (AFN 2011).

POSTSEASON SUBSISTENCE SURVEYS

Stratified Random Survey Methodology

The Division of Commercial Fisheries adopted a harvest estimation methodology similar to the Yukon River subsistence salmon monitoring program (Busher et al. 2007). Households of each community were stratified into 3 groups:

1) "Usually fish" (total salmon harvest > 1); and participated at least once in the past two years;

2) "Usually do not fish" (total salmon harvest = 0); did not participate in subsistence fishing activities in the past two years; and

3) "Unknown"; a household that has no harvest record.

Stratum assignment for each household could change over time to reflect changes in the level of participation in the subsistence fishery. However, once the household stratum designation was set for the survey year, it was not reclassified after the survey (i.e., there was no post-survey stratification prior to data analysis). Stratum designations were reassigned to all households using the previous year's survey data (if available) and updated just prior to beginning the survey season each year.

For the first two strata, "usually fish" and "usually do not fish," 30–50% of households were randomly selected for household survey. For the third stratum, "unknown," 100% of households were surveyed. For any stratum with less than 5 households, all households in that stratum were surveyed. If the total community size was less than 40, all households in all strata were surveyed.

Sampling Summary

For this study, "fishing household" (the sampling unit) is defined as a household that participated in subsistence fishing activities, such as harvesting and/or processing salmon. The number of

salmon caught and processed by a group of two or more households is considered "group harvest" (Question 5, Figure 3).

During the interview a fishing household was identified by the question: "Did anyone in your household harvest salmon for subsistence use OR keep fish for subsistence use from commercial fishing?" (Question 3, Figure 3). The surveyor was instructed to clarify that "harvest" includes any participation in the subsistence fishery, such as cutting fish. In the case of a household fishing with or helping others, the household harvest documented in this study was only that household's *share* of the group harvest (Question 7, Figure 3). This household harvest included salmon that members of this household gave away, ate fresh, fed to dogs, or lost to spoilage. To avoid double-counting of fish between households, salmon received from other households (outside the fishing group) are not considered part of the household harvest because they are part of the harvest of the household that *gave* them the fish.

Household Updates

The first step in the interview program was to identify Kuskokwim Area households and to make sure all area households were accounted for in the database. ADF&G Division of Subsistence database of Kuskokwim Area households (families database), containing the historical list of households in each community, was further updated in 2008 by asking knowledgeable individuals in each community to review the household list. Each household was given a unique numerical code or Household Identification Number in the database. Community census lists, telephone and utility lists, and the Alaska Permanent Fund Dividend application list were also used to update ADF&G's families database when necessary. Any new households were added and households that had moved out of the community were deleted as part of the survey data-entry process and the changes were rolled over and available for the following year's survey season.

During September and early October 2008, staff from ADF&G used the household list created by the Subsistence Division in 2007 as a base household list, and attempted to update it. During this process each community was informed of the postseason subsistence survey project and was invited to participate in the survey process. Only the Bering Sea coast communities of Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak, and Chefornak and the North Kuskokwim Bay communities of Kipnuk and Kwigillingok declined to be surveyed, as they have in the past (Fall et al. 2009).

For Bethel households, ADF&G attempted to use local utility and city occupancy/household information to update the list; however, this was unsuccessful. Instead, a more complete household and occupancy list was generated by touring the entire community by vehicle and recording the addresses of all dwellings. This dwelling list was used for conducting subsistence surveys in 2008.

ADF&G staff also attempted to update the existing Aniak household list with information from local city and tribal offices, but the information was not readily available. As an alternative, ADF&G and Kuskokwim Native Association (KNA) staff decided to attempt to survey all Aniak households, recording updated household information as surveys progressed. The ADF&G subsistence survey database was updated with new or changed Aniak household information after surveys were completed for 2008, in effect creating a new household list for the community of Aniak. In 2009, all households were checked against known households historically, and any pre-existing household identification numbers were assigned to households still living in the community.

ADF&G staff also developed contact lists and worked closely with local tribal officials to update existing household lists for all remaining Kuskokwim Area communities. In communities with outdated household lists, more effort was put forth to find and survey those households with "unknown" fishing practices and new households.

Beginning in 2009, surveyors had a map of each community (except for Bethel). They met with tribal council or city staff and updated the map by labeling each household by name and verified names on the map against a list of the families in the current database. Household locations were recorded with a Global Positioning System, so the data could be electronically stored, and maps were updated each year, with the household name and household identification listed with each house. These maps not only helped with updating the families database, but they made it simpler for surveyors to navigate the community, and in large communities, to visit only houses selected for survey, thus increasing efficiency, and decreasing any unnecessary disruption to those not selected for survey. Once all households were identified and updated in the database, they were assigned a use group based on whether they fished, did not fish, or their harvest practices were unknown. All households in each community were included in the random selection process and the households selected for survey were indicated on the household lists provided to the surveyors.

Surveys were conducted in early fall because most salmon fishing was finished, yet fishermen could still recall their harvest numbers because the season had ended recently. Before conducting interviews, surveyors were trained in surveying techniques, including suggestions on how to get the best information possible from people who may not know the exact number of fish they harvested or who are not accustomed to quantifying their fish harvest. In addition, the surveyors were trained in salmon species name identification, as local names for salmon vary throughout the drainage. The surveyors were also briefed on any fishery issues or concerns from the recent subsistence and commercial salmon fishing season, in case the surveyors encountered these issues when conducting surveys. Surveyors had a responsibility to attempt to contact all selected households, ask questions consistently and understandably, and foster a cooperative atmosphere. Surveyors attempted to interview a member of each selected household, preferably the primary harvester. Because incomplete surveys occasionally occurred, the number of households contacted for any given question varied. Occasionally, interviews were conducted with households not pre-selected for the survey. This happened when a "new" or previously "unknown" household was found by surveyors, in which case the household would not appear on the household list previously selected for survey, or when individuals not selected for survey voluntarily provided surveyors with their harvest information. Data from these additional surveys were incorporated into the database and results because they provided an opportunity to assign them to the correct use group (e.g., "usually fish," "usually do not fish"), making them more likely to be correct at time of next random selection (Appendices A1 and A2).

The Survey Instrument

Interview questions were designed to provide a quantitative and qualitative assessment of each household's subsistence salmon harvest (Figures 2 and 3). Household members were asked their total salmon harvest (by species) for the season, the fishing gear used, and areas fished. Households were also asked how many families had been involved in the fishing group and how much of the group's catch went to the selected household. Households were also asked whether the household had given salmon to other families (outside of the fishing group) or whether they had received salmon from other subsistence households (outside of the work group), from a

commercial fisherman, or from a test fishery project. In addition, households were asked how many salmon were harvested for dog food.

In order to keep data consistent and comparable between years, the subsistence survey questions generally have been kept the same from year to year. The primary intent of the survey was to quantify the household's total subsistence salmon harvest, however the survey instrument also included qualitative questions regarding the salmon harvest, i.e. whether any fish were lost (e.g., due to spoilage), and whether or not the household's goals for salmon were met. Harvest of non-salmon species as well as any general comments the interviewee had were also recorded on the survey instrument.

After the households were interviewed, survey forms were edited. During editing, forms from fishing group members were compared to identify discrepancies. Follow-up calls were made to try to settle discrepancies. Occasionally, fishing group members simply did not agree on numbers for salmon harvest. In this event, ADF&G project staff made a judgment on how to best represent the fish harvest on the appropriate survey forms and priority was always given to ensuring the accuracy of the *household* harvest over the *group* harvest.

Fishermen occasionally did not know the actual number of fish harvested, instead reporting harvest in alternative terms, such as the number of 5-gallon buckets, plastic bags, gunny sacks, or pounds. ADF&G devised a conversion sheet to estimate fish numbers in these circumstances (Appendix I1). Any calculations were made when the completed surveys were edited.

Survey Form Changes

In an effort to match the question order with the data entry system and to have a more natural or intuitive flow of questions during the interview process, in 2009, some of the questions were grouped together or the order changed from the 2008 survey (Figures 2 and 3). One change to the instrument was the removal of the question about "household use". This question was redundant since, in addition to the household harvest, numbers of fish lost and fish given away were also recorded, and feedback from surveyors had been that the question was very confusing to respondents.

The section about fishing location was refined in 2009. This section is used internally for fishery managers to see where people are harvesting their fish within the drainage. But the designations of above/below each location on the 2008 survey form overlapped with the next location, thus providing unclear data. For example, for Crooked Creek, the interviewee was asked if they fished above or below, and similarly, for Sleetmute they'd be asked if they fished above or below. But this was ambiguous because someone fishing below Sleetmute could also be considered to be fishing above Crooked Creek. Location delineations were made more precise in 2009 and worded more clearly on the survey form (Figures 2 and 3).

In 2008 and 2009, questions were asked in order to attempt to assess the 'success' of fishermen's' subsistence harvest; however, in 2008 these questions were revised from earlier surveys and years in an attempt to have people identify what *percentage* of their goals or needs were met (in 25% increments) (Question 21, Figure 3). Though people responded to this question, and data is presented here, it was reported by surveyors that people seemed to have a hard time understanding what was being asked. For this reason, the question about harvest needs was modified in 2009, and better response rates and consistency in questioning were achieved. In 2009, the question was changed to ask the *number* of fish, by species, the household "usually harvested" or "needed" to meet their harvest goals (Question 13, Figure 2). This was done to

better assess whether residents met their subsistence salmon goals or needs, and to be able to compare answers from all respondents. Though these are qualitative data, the responses ('needed' number of fish divided by household harvest of fish) were binned by percentages of harvest met: 25%, 50%, 75% and 100%. For this question 2009, responses were divided into two categories, 1) responses from households that harvested salmon, and 2) responses that did not harvest salmon. For the purposes of this analysis, responses from category 2 are not included. The reason for this is that these households will likely be receiving salmon throughout the year and at the time of the surveys, a harvest needs and success assessment was premature (Appendices F1 to F8). In order to assess the total number of fish that are needed for the whole community, in 2009, the number of fish reported as needed from all households were expanded to create an overall estimate of how many salmon were needed (Appendix F9).

In 2008, the question about harvest of other (non-salmon) fish distinguished whitefish, *Coregonus* spp., only by "small" (less than 4 lbs) and "large" (greater than 4lbs). In 2009, the question was refined to include 3 specific whitefish species: humpback whitefish (*Coregonus pidschian*), broad whitefish (*C. nasus*), and cisco (*C. autumnalis* and *C. laurettae*). This change was accompanied by increased surveyor training in delivery of the question and the incorporation of pictures of the different species in the hope of helping fishermen to more accurately estimate the number of each species harvested.

In 2008, the question regarding how many of each species of salmon were "lost" (due to spoilage, animals, etc.) did not include a line for the reason for the loss. In 2009, the question "How were the salmon lost?" was added so that it would be possible to qualify the sources of lost harvest.

In 2008, the question regarding salmon harvested for dogs asked if the fish were from commercial or subsistence harvest. In 2009, this question was simplified such that no distinction was made as to which fishery the fish came from. The total number of fish of each species of salmon retained from commercial fishing for subsistence use was already included in the total household harvest estimate, and it was deemed unnecessary to determine whether the fish came from commercial or subsistence fishing.

HARVEST CALENDARS

In addition to household harvest survey, subsistence salmon harvest calendars were distributed by mass mailing in late April or early May each year to ensure they are available to fishermen prior to the start of the salmon fishing season. The calendar has been instrumental for examination of subsistence harvest timing, and assisted fishermen in keeping track of their daily salmon harvest inseason for reference during postseason surveys.

Calendar mailings were based on the most up-to-date household lists used in the harvest monitoring program. In 2008, calendars were sent by the Division of Subsistence to all known households. Starting in 2009, Division of Commercial Fisheries sent out the harvest calendars only to fishing households, to cut down on printing costs. Extra calendars were kept at the Bethel ADF&G office for distribution as needed or upon request. In an effort to increase the use and return rate of subsistence calendars, public service announcements were broadcast on local radio stations inseason reminding fishermen to keep their calendars up to date and describing the importance of calendars for documenting subsistence use. Fliers describing the importance of subsistence calendars and the postseason subsistence survey project were also distributed to local communities for posting in public locations such as council offices, local stores, and post offices. The 2009 calendar was designed differently than previous calendars, in a more sturdy, 8.5" x 11"

wall-calendar style with photos on each page and a prize drawing (three $100 dollar prizes) to encourage people to fill them out and return them to ADF&G.

Data from the returned calendars were not used directly to generate Kuskokwim Area harvest estimates, but provided harvest-timing information. However, because gathering harvest-timing data from harvest calendars was not a primary objective of this project, those data were not included in this report.

DATA ANALYSIS

Harvest Estimation

Expanded Community Harvest

Subsistence salmon harvest reported by sampled households was expanded to estimate community harvest for each species using a stratified random sampling expansion technique (Scheaffer et al. 1999). The stratified expansion procedure was performed for a community only if a sufficient number of households were sampled. The criteria for whether or not to do an expansion were: large communities (greater than 30 households) required a sample size of at least 10 respondent households, and small communities (at most 30 households) required a sample size of at least 5 respondent households. In the instances when the minimum sample requirements were not met, statistical expansion was not performed. In those situations, the community-based harvest was estimated using Bayesian methods.

Denote that:

N_{kj} = the number of households in *j*th (*j* = usually fish, usually do not fish, unknown) use group of the *k*th community;

n_{kj} = the number of surveyed households in the *j*th use group of the *k*th community;

y_{kji} = response of *i*th surveyed household ($i = 1 \ldots n_{kj}$) in the *j*th use group of the *k*th community (e.g., the number of fish harvested by a household).

Mean household response in the *j*th user group of the *k*th community ($\bar{y}_{kj}$) was calculated as:

$$\bar{y}_{kj} = \frac{\sum_{i=1}^{n_{kj}} y_{kji}}{n_{kj}}, \qquad 1$$

and its standard error (SE_{kj}) was calculated as:

$$SE_{kj} = \sqrt{\frac{s_{kj}^2}{n_{kj}}\left(\frac{N_{kj} - n_{kj}}{N_{kj}}\right)} \quad \text{where} \quad s_{kj}^2 = \frac{\sum_{i=1}^{n_{kj}} \left(y_{kji} - \bar{y}_{kj}\right)^2}{n_{kj} - 1}. \qquad 2$$

The estimate of total harvest of the *k*th community ($\hat{T}_k$) was calculated as:

$$\hat{T}_k = \sum_{j=1}^{3} N_{kj}\bar{y}_{kj} \quad (3)$$

and its 95% confidence interval (95% CI_k) was calculated as:

$$95\%\mathrm{CI}_k = 1.96 \cdot \sqrt{\hat{V}(T_k)} \text{ where } \hat{V}(T_k) = \sum_{j=1}^{3} N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}}\right)\left(\frac{s_{kj}^2}{n_{kj}}\right). \quad (4)$$

When one stratum was not surveyed, total harvest of a community ($\hat{T}_k$) was calculated as:

$$\hat{T}_k = \left(\frac{\sum_{j=1}^{3} N_{kj}}{\sum_{j=1}^{2} N_{kj}}\right)\sum_{j=1}^{2} N_{kj}\bar{y}_{kj} \quad (5)$$

and its 95% confidence interval (95%CI_k) was calculated as:

$$95\%\mathrm{CI}_k = 1.96 \cdot \sqrt{\hat{V}(T_k)} \text{ where } \hat{V}(T_k) = \left(\frac{\sum_{j=1}^{3} N_{kj}}{\sum_{j=1}^{2} N_{kj}}\right)^2 \sum_{j=1}^{2} N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}}\right)\left(\frac{s_{kj}^2}{n_{kj}}\right). \quad (6)$$

Harvest Estimation of Non-surveyed and Under-surveyed Communities

Harvests of several communities were not estimated every year because surveys were not conducted or survey data were insufficient. Harvests of those communities were estimated by employing a Bayesian hierarchical multiple imputation method (Honaker and King 2010; King et al. 2001). In this method, it was assumed that 1) the pattern of missing harvest data take missing at random (MAR) process, and 2) the harvest data possess multivariate normal distribution. Under these conditions, harvests of communities in particular years can be estimated from harvest records of the communities in other years and surrounding communities. For instance, the harvest of the un-surveyed community of Tuntutuliak in 2008 can be estimated by its harvest during 1990–2007 and harvests of other middle Kuskokwim communities. It should be noted that this estimation method is available and appropriate only for communities with several years of annual harvest estimates.

Let $D_{kj.obs}$ be observed data (e.g., average harvest per household) for k communities (1…k) with j years (e.g., j =20, data available for 1990–2009).

$$D_{kj.obs} \sim N(\mu_k, \Sigma_k), \quad (7)$$

where μ_k has a normal prior distribution with mean μ and variance σ^2, and Σ_k is Wishhart distribution of $k \times k$ dimensions.

$$\mu_k \sim N(\mu, \sigma^2)$$
$$\Sigma_k \sim W(I_k, k) \quad . \tag{8}$$

Then, posterior for μ_k and Σ_k were derived as:

$$\tilde{\mu}_k, \tilde{\Sigma}_k \sim P(\mu_k, \Sigma_k \mid D_{kj.obs}) \quad . \tag{9}$$

From this predicted value for missing data $D_{kj.mis}$ were derived as

$$\tilde{D}_{kj.mis} \sim P(D_{kj.mis} \mid D_{kj.obs}, \tilde{\mu}_k, \tilde{\Sigma}_k) \quad . \tag{10}$$

For grouping of the k communities, geographic regions of the Kuskokwim Management Area were used: 1) lower Kuskokwim River and Kongiganak; 2) middle Kuskokwim River; 3) upper Kuskokwim River; and 4) South Kuskokwim Bay.

In applying the above method, log-transformed annual average number of fish harvested per household $D_k = \log(T_k/N_k+1)$ was used. This was based on assumptions: 1) fishing characteristics of communities (e.g., proportion of fishing households, fishing demands, fishing efforts, etc) are constant over time, and 2) changes in average household harvests are primarily due to abundance of fish or fishing regulations affecting all communities.

For the Bayesian estimation, WinBUGS 1.4.3 (Lunn et al. 2000) with default initial values was used. A total of 55,000 imputations were generated (after discarding 5,000 initial burn-in iterations) and the mean value of these imputations was calculated. The resulting mean household harvest was back-transformed and multiplied by the number of households in the community that year to estimate the unknown total community harvest. Total community harvest was calculated as:

$$\tilde{T}_{kj} = N_{kj} \exp(\tilde{D}_{kj.mis}) \quad , \tag{11}$$

and its 95% confidence interval was estimated as:

$$95\%\text{CI} = N_{kj} \exp\left(1.96 \cdot \sqrt{V(\tilde{D}_{kj.mis})}\right) \quad , \tag{12}$$

where $V(\tilde{D}_{kj}^{mis})$ is the standard deviation of the Bayesian estimate.

Total Kuskokwim Area Harvest

Total number of salmon harvested in the Kuskokwim Area ($\hat{T}$) was estimated by summing harvest estimates of all communities,

$$\hat{T} = \sum_{k=1} \hat{T}_k \quad , \tag{13}$$

and its 95% confidence interval (95%CI) was calculated as:

$$95\%\text{CI} = 1.96 \cdot \sqrt{\hat{V}(T)} \text{ where } \hat{V}(T) = \sum_{k=1} \hat{V}(T_k). \quad 14$$

RESULTS

HOUSEHOLD SELECTION AND SURVEY

The Kuskokwim Area results reported here include communities located along Kuskokwim River, Kongiganak, and the South Kuskokwim Bay communities. The Bering Sea Coast communities and North Kuskokwim Bay communities of Kipnuk and Kwigillingok were not part of the survey process and estimates of their harvests were not otherwise possible; therefore, no data are reported for those communities, though the total number of households in each community remains on most data tables.

2008

Bethel subsistence surveys were conducted by ONC from October 26 to December 15, 2008. ONC contacted 446 (23%) of 1,981 households. Aniak subsistence surveys were conducted by KNA during November and December, 2008. KNA contacted 100 (56%) of 177 households (Table 2).

ADF&G surveys began in the community of Napakiak on October 15. Door-to-door surveys were completed in the following communities from the lower to upper Kuskokwim River: Napakiak, Napaskiak, Oscarville, Kwethluk, Akiak, Akiachak, Tuluksak, Kasigluk, Lower Kalskag, Upper Kalskag, Chuathbaluk, Crooked Creek, Red Devil, Sleetmute, Stony River, McGrath, and Nikolai. For North and South Kuskokwim Bay, Kongiganak, Goodnews Bay, Platinum, and Quinhagak were surveyed. ADF&G contacted 445 (23%) of a total 1,931 households in these communities (Table 2; for details of proportion of houses selected for survey that were surveyed, see Appendix A1). Overall, 23 of 38 communities were surveyed door-to-door in 2008. Data entry of all surveys collected was completed near the end of March, 2009.

2009

Bethel subsistence surveys were conducted by ONC from October through December, 2009. ONC contacted 699 (35%) of 2,005 households. Aniak subsistence surveys were conducted by KNA from October through December, 2009. KNA contacted 168 (92%) of 183 households (Table 3). The total number of households surveyed increased in 2009 as a result of much improved methods for updating household lists, staff training, and use of maps.

In 2009, door-to-door surveys began October 1, 2009 and were completed by ADF&G in all intended communities from lower to upper river: Eek, Tuntutuliak, Napakiak, Napaskiak, Oscarville, Nunapitchuk, Atmautluak, Kwethluk, Akiak, Akiachak, Tuluksak, Kasigluk, Lower Kalskag, Upper Kalskag, Chuathbaluk Crooked Creek, Red Devil, Sleetmute, Stony River, McGrath, and Nikolai. For North and South Kuskokwim Bay: Kongiganak, Goodnews Bay, Platinum, and Quinhagak were surveyed. ADF&G contacted 862 (44%) of 1,950 households. Overall, 27 of 38 communities were surveyed door-to-door in 2009 (Table 3; for details of proportion of houses selected for survey that were surveyed, please see Appendix A2). Data entry of all surveys collected was completed near the end of March, 2010.

Harvest Estimates

In 2008, the total estimated salmon harvests (with 95% confidence intervals) for the Kuskokwim Area were: 103,713 (94,818–112,608) Chinook salmon; 71,649 (64,106–79,192) chum salmon; 64,183 (58,545–69,821) sockeye salmon; 52,742 (42,147– 63,337) coho salmon; and 1,342 (756–1,928) pink salmon (Table 2). These include both expanded community harvest estimates for surveyed villages (Appendices B1–B5), and estimates for unsurveyed and under surveyed communities.

In 2009, the total estimated salmon harvests (with 95% confidence intervals) for the Kuskokwim Area were: 82,100 (77,418–86,782) Chinook salmon; 45,199 (41,265–49,133) chum salmon; 37,971 (35,075–40,867) sockeye salmon; 32,090 (27,493–36,687) coho salmon; and 563 (184–942) pink salmon (Table 3). These include both expanded community harvest estimates for surveyed villages (Appendices B6–B10), and estimates for unsurveyed and under surveyed communities.

Primary Fishing Gear

In 2008 and 2009 the majority (76% and 74%, respectively) of fisherman throughout the Kuskokwim Area indicated that the primary gear type used for subsistence salmon fishing was drift gillnets (Appendices C3 and C4).

Estimated Number of Subsistence Fishermen, People, and Harvest Sharing

In 2008, the estimated number of households that subsistence fished for salmon was 2,077 (Appendix A3) and in 2009 was 2,313 (Appendix A4).

The total estimated number of people living in the communities that participated in the study (Kongiganak, Kuskokwim River and South Kuskokwim Bay communities) in 2008 was 14,058 (Appendix A5) and in 2009 was 15,479 (Appendix A6).

While the concept of "sharing" has many and varied definitions, sharing here is defined as the immediate distribution of salmon upon harvest to households outside of one's subsistence salmon harvest and processing work group. It is important to collect sharing data as an indication of the demand for fish. In 2008, 932 households reported receiving 1,904 Chinook; 966 chum; 1,021 sockeye; 991 coho; and 17 pink salmon from subsistence fishermen, commercial fishermen, and the local Bethel test fishery (Appendix C1).

In 2009, 1,649 households reported receiving 2,508 Chinook; 1,226 chum; 1,797 sockeye; 1,360 coho and 6 pink salmon from subsistence fishermen, commercial fishermen, and the Bethel test fishery. In both years the majority of fish received by individuals were from subsistence fishermen.

Subsistence use of salmon for dog food

In 2008, 52% of respondents reported owning dogs. Of households with dogs, the average number of dogs per household was 2.9. The number of households that reported feeding whole salmon to dogs was 41 (or 4.5% of respondents), and among these households an average of 125 salmon were fed to dogs (Appendix D1).

In 2009, 55% of respondents reported owning dogs. Of households with dogs, the average number of dogs per household was 2.5. The number of households that reported feeding whole salmon to dogs was 60 (or 3.6% of respondents), and among these households an average of 113 salmon were fed to dogs (Appendix D2).

Lost Fish

In 2008, 34 households (4%) reported losing fish (i.e., not edible for human consumption due to spoilage, animals, etc.) In 2008, a total of 233 Chinook, 239 chum, 174 coho and 287 sockeye salmon were reported lost (Appendix E1).

In 2009, 63 households (4%) reported losing fish. A total of 617 Chinook, 516 chum, 515 coho and 597 sockeye salmon were reported lost for that year (Appendix E2). In 2009 an additional question was added to the survey form which asked the reason why fish were lost. These responses were categorized, and of those households that provided a reason, 52% reported losing fish to animals (responses included: "bears," "birds," and "otters"); 31% to weather-related reasons ("rain," "moldy," "flies," and "spoiled"); 13% to human factors ("stolen," and "freezer problems") and 4% to disease ("diseased fish").

Subsistence Salmon Needs

Regionwide the majority (45% in 2008 and 70% in 2009) of fishing households surveyed reported meeting their subsistence harvest goals or needs. By subregion, the proportion of households meeting their needs varied, and particularly between years (Appendices F1–F8). For instance, in 2008 the Upper Kuskokwim subregion showed that the majority (approximately 43%) of households *did not* meet their needs for most species of salmon, whereas in 2009 the vast majority (approximately 75%) of the Upper Kuskokwim households reported meeting their needs for most salmon species for the year (Appendices F5–F8). In 2008 the North Kuskokwim Bay and the South Kuskokwim Bay subregions had a more varied mix of households *partially* meeting their needs (Appendices F1–F4). Whereas in 2009, for all species of salmon, and for each subregion, the majority of all fishing households indicated they met their subsistence needs for the year (Appendices F5–F8).

In 2009, the majority (approximately 70%) of respondents that *did not* meet their salmon needs gave reasons of a personal nature with 20% of households citing that they did not fish as the main reason for not reaching their harvest goals (Appendices F10–13). "Personal" reasons included statements describing being too busy to fish due to work or medical reasons, or comments regarding a lack of or problems with fishing equipment such as boats or fishing gear. Other examples of "personal" responses include having no freezer space to store salmon, sharing entire salmon harvest with others, and families newly arrived in the village. The question regarding why people did not meet their subsistence needs was included on the survey form in 2008 but the data quality for that particular question indicated a problem with surveyor delivery of that question, therefore 2008 responses are not included here.

In 2009 the estimated number of salmon needed was higher than the estimated number of salmon harvested by subregion and species (Appendix F9). This indicates that the unmet needs of households (described in Appendices F1–F8) may be substantial, but further investigation would be needed to qualify this observation.

Reported and Estimated Harvest of Non-salmon Species

Appendices C5 and C6 list the harvest of non-salmon species reported in the Kuskokwim Area, these include large (> 4 lbs) and small (< 4 lbs) whitefish, sheefish (*Stenodus leucichthys*), burbot (*Lota lota*), northern pike (*Esox lucius*), blackfish (*Dallia pectoralis*), grayling (*Thymallus arcticus*), arctic char (*Salvelinus alpinus and S. malma*, not differentiated), Pacific herring (*Clupea pallasii*), rainbow smelt (*Osmerus mordax*), and rainbow trout (*Onchorhynchus mykiss*).

For both years, rainbow smelt were harvested in greatest abundance relative to the other non-salmon species.

Appendices C7 and C8 detail the estimated (expanded) harvest of large and small whitefish (for all communities surveyed) in 2008, and Appendices C9 and C10 detail estimated harvest of humpback whitefish and broad whitefish, respectively in 2009.

DISCUSSION

HOUSEHOLD SELECTION AND SURVEY

As described in methods, determining the total number of households in a community, and updating the families database is an ongoing process. The 2007 and 2008 survey years were a transition period between sampling protocols, marked by relatively low sample sizes. The level of detail when updating the families database increased considerably by 2009 with the introduction of improved training, the use of maps, overall greater sample sizes, and increased effort to document changes and update the household lists even for households not surveyed. Therefore it is assumed that the household numbers for each community in 2009 are likely to be the most accurate, to date. If in 2008 a community's total number of households differed from 2009 by more than would be expected through natural migration (i.e., more than 10 houses different), for data analysis purposes, the number of households for that community may have been adjusted to better match 2009, assuming that the error would more likely exist in 2008.

In 2009, the harvest monitoring program became fully staffed with the hiring of an ADF&G Fishery Biologist Project leader, so there was much more oversight inseason of the overall data collection, project logistics and preseason planning than in 2008. This allowed for more communities to be sampled more completely, and for training improvements to be implemented before the 2009 season.

Starting in 2009, there was a more collaborative training approach taken where all surveyors from KNA, ONC, and ADF&G were given the same background information, specific question-by-question training in surveying techniques, and door-to-door training with crew and project leaders within communities. Any problem-areas discovered after 2008 were addressed and remedied through increased training and increased oversight of survey data *as* it was collected. More effort was put towards adjusting the inseason logistics such that surveyors spent adequate time in all communities (unless weather delays or community events prevented surveying) and emphasis was placed on achieving a greater sample of selected households than was achieved in 2008.

In 2008 surveyors did not have maps to use in the villages, so adhering to the stratified random sampling protocol was challenging because they had to go door-to-door just to identify who lived there. Once someone answered the door, they may have been surveyed, whether they were randomly selected or not. In 2009, the introduction of community maps helped the surveyors to increase their sample sizes, and to verify and update the household lists because it became much more evident to them who needed to be contacted, and whether or not all households were represented on the household lists. The maps generally made it easier for surveyors to navigate a village, and to make follow-up visits when selected households were not home on the first attempt. Though the maps were one more component of data collection requiring attention and revision by the surveyors, they improved the sample size, efficiency, and ease of logistics overall.

In 2009, it was possible to start the surveying two weeks earlier in the season, which enabled surveyors to reach all targeted communities within budget and time constraints. In 2008, five communities' harvests were estimated using Bayesian imputations because they were not surveyed. While these estimates are believed to be valid for these communities, it is our intent to survey each participating village each year, when feasible.

HARVEST ESTIMATES

There are many factors affecting subsistence salmon harvests, including personal, cultural, socioeconomic, environmental, and salmon run dynamics. In 2008 and 2009, salmon run abundances (as indicated by overall escapement) in the Kuskokwim area were relatively similar, but the Chinook salmon run timing in 2008 was slightly later than in 2009. In 2008 the subsistence salmon harvest for the Kuskokwim Area was 33% higher than the harvest in 2009, however determining the reasons for the difference in harvest is not possible within the scope of this study. For 2008 and 2009, the harvest estimates cannot be directly compared to previous survey results. The sampling design and expansion tools differed from previous survey years and adjustments to previous data have not been presented in this report, but will be included in future reports beginning in 2010. Due to these and other factors, trends and patterns could not be directly observed from the data, and similarly, the application of qualitative responses to help clarify trends and patterns has limited usefulness.

Bias among surveyors may exist, when deviating from the random stratified protocol for surveying selected households, and this bias is not measured or quantified in this study. For instance, in 2008, feedback from some of the staff indicated that some surveyors may have put more effort into finding known "fishing" households over those that do not harvest, which could bias the average harvest per household higher. Conversely, if a surveyor did not contact all randomly selected households, they could miss a "high harvester" (often someone who feeds salmon to dog teams), and missing even a few of these high harvesters can bias the average household estimate to be lower. In 2009, in an attempt to avoid these types of bias, training was increased with all surveyors regarding the importance of sampling all *selected* households, and by explaining to surveyors how bias can affect the estimates. For the results reported here for 2008 and 2009, it is unclear whether the estimates are biased. The confidence intervals in 2008 ranged from 8.5% of the estimate (for Chinook salmon) to 20% of the estimate for coho salmon, whereas in 2009, the confidence intervals ranged from 5.7% for Chinook salmon, to 14% of the estimate for coho salmon. This increase in precision of the estimates is likely the result of getting better sample sizes of selected households and improved training overall in 2009.

In light of changes to methodology beginning in 2008 for the estimation of subsistence salmon harvest, historical estimates (1990 to 2007) are not reported here. Comparisons of the 2008 and 2009 estimates with published historical estimates should be made cautiously and with limited application. A separate project (Hamazaki 2011) analyzes and discusses the recalculation of historical salmon harvest estimates using the methodology adopted by the Commercial Fisheries Division for the harvest monitoring program beginning in 2008. Limited conclusions should be made about the 2008 and 2009 estimated salmon harvest and any harvest trends, until these estimates can be compared with revised historical estimates.

ESTIMATED NUMBER OF PEOPLE, SUBSISTENCE FISHERMEN, HARVEST SHARING AND NEEDS

There are several inseason and postseason methods for evaluation of salmon runs and whether fishermen are meeting their subsistence needs. Fishery managers have routinely maintained communications with fishermen to obtain information on fishing success in communities, particularly through the Kuskokwim River Salmon Management Working Group meeting process which provides fishermen in the entire Kuskokwim River drainage the opportunity to discuss the salmon run and their harvests via teleconference (Brodersen and Carroll 2011). During these Working Group meetings, people will discuss their weekly success with their salmon harvests, how they feel the runs are progressing, and other information. Similarly, the Lower Kuskokwim River inseason subsistence catch monitoring project collects data on subsistence fishermen's assessment of relative salmon run timing and abundance, as well as other qualitative information including whether or not fishermen are achieving their harvest goals, and factors affecting their harvests and these reports are given weekly during the fishing season (Dull and Shelden 2006). These methods of assessing harvest success are valuable for run management inseason, but they are entirely qualitative, not all subregions of the Kuskokwim Area are represented, and they do not provide harvest estimates. For this reason, the postseason subsistence harvest survey program is invaluable to gaining a more complete picture of the salmon harvest for the whole Kuskokwim Area each year, though the data are not available until long after the fishing season ends.

One method for assessing the relative success of Kuskokwim Area fishermen in meeting their harvest needs postseason is to compare the annual estimated subsistence harvest to the ANS harvest ranges established by the BOF. The ANS ranges represent the needs of all subsistence users drainagewide and do not necessarily reflect the needs of specific individuals, communities, or sections of the drainage. ANS can be used by the BOF as a metric to determine if reasonable subsistence fishing opportunities have been provided. ANS levels can require periodic adjustments since the ANS cannot account for trends over time, such as changes in fishing patterns due to population shifts or changes in the fisheries (Jallen and Hamazaki 2011). The 2008 subsistence salmon harvests in the Kuskokwim River were higher than the ANS upper levels for Chinook salmon, sockeye salmon, and coho salmon, and fell within the ANS range for chum salmon. In 2009, despite lower harvests overall, all salmon harvests in the Kuskokwim River fell within the ANS ranges for that area. For the Kuskokwim Bay, which falls under "remainder of the Kuskokwim Area" (5 AAC 01.286), the ANS range is expressed in total number of salmon (7,500 to 13,000) and the salmon harvests in 2008 and 2009 exceeded and fell within the range respectively.

While comparisons of the annual drainagewide harvest with ANS provides insight into the relative success of all fishermen, the survey results are unique in breaking down proportion of harvest needs met by species and community (Appendices F1–F8). The data may provide a postseason assessment of the season's run strength, as ideally a strong run would be reflected in a strong subsistence harvest, with a higher proportion of fishermen meeting their harvest needs. However, it has been observed in other areas, such as the Yukon River drainage that approximately 20–30% of households report their needs were not met even in years with relatively good escapement (Borba and Hamner 2001; Jallen and Hamazaki 2011). Subsistence research has repeated this observation in numerous studies, that 20–30% of households in kinship-based subsistence economies could be expected to fail to produce enough food to feed

themselves (Wolfe et al. 2007; Andrews 1988; Magdanz et al. 2002; Sahlins 1972; Sumida 1989; Sumida and Andersen 1990; and Wolfe 1987). In 2008 and 2009 9% to 16% of households reported not meeting their harvest needs for salmon.

In 2009, households that reported not meeting their needs listed mainly "personal reasons" or "not fishing" as to why they did not meet their needs and only 5% of people cited run dynamics as a reason for not meeting their salmon needs. Therefore it may be assumed that in 2009, medical reasons, personal family issues, being too busy, having boat or motor issues, or having to work are the most common factors, other than simply not fishing, that affected people's ability to meet their needs. Furthermore, Appendices G1 and G2, which summarize the general comments that respondents chose to share with surveyors, show that the most common comments in 2008 and 2009 were those pertaining to a positive salmon run dynamic. These comments include, e.g. "fishing was good", "caught enough", "more fish than last year," etc. Though negative comments about the salmon run were made which would include statement such as: "fishing was slow", and "not as many fish this year", these responses were less frequent in both years. This may indicate that the salmon runs were perceived as good overall in 2008 and 2009, but that perception could vary by household and subregion and is based on a relatively small sample of comments which are made without any specific question prompting other than: "Do you have any additional comments for us?"

The access to salmon as one travels further upriver seems to decrease, with reports of salmon catchability decreasing in the middle and upper river portions of the Kuskokwim Drainage (Brodersen and Carroll 2011). This is likely a result of the fact that approximately 85% of the total harvest comes from the lower river, where approximately 80% of the households are situated. These lower river residents have access to the salmon run early and while it is most abundant, but once this large proportion of harvest is removed, and the fish escape into tributaries, travelling further distances to the middle and upper sections of the river, they may become more sparsely distributed. This can make them harder to catch, so residents further upriver may need to put more effort into achieving their harvest goals, and may be less able to reliably achieve their goals. One might assume that upper river households may be less likely to completely meet their needs than the middle river communities, but this varied among species and years (Appendices F1–F8). Some individual communities and households may have a harder time meeting goals which could be an effect of location, as well as the other factors affecting harvest success discussed above.

The total number of fish calculated as "usually harvested" or "needed" in 2009 was consistently higher than what was *harvested* in 2009. However, there are limitations to what this data can be used for, as there are confounding factors affecting the estimation of the amount of salmon "needed." For instance, households may use or would like to harvest salmon for subsistence use, but may not be able to fish for themselves because they are unable to, for example due to physical or economic restrictions such as being elderly, or having no access to a boat or nets, etc. Regardless of their ability to fish, these households may still have a *need* for salmon. People who do not fish rely on receiving fish from family, friends and others who harvest salmon. Fish are generally given to them throughout the winter as the need arises. At the time of survey, it may be hard for non-fishermen to assess whether their needs are met because they may not have received their fish yet, or may not know if what they have received will last them the winter. What confounds this further is that fishing families who generally harvest fish to share with others will often factor in those extra fish that they harvest to give away, when reporting their needs for the

year. The receivers of those fish will also report how many they need, so it is likely there is double-counting of fish 'needed' (Appendix F10).

Furthermore, it may be difficult to quantify the number of fish a household receives, as it is often transferred as processed or cooked salmon among households, not as whole fish (Jallen and Hamazaki 2011). A confounding factor for those with subsistence salmon needs, is that perception of whether needs are met or not, may not necessarily relate to an exact number of fish, but more how the fishing season went for the family. Or it could be that what a family needs in one year is not the same as it needs in another year. Also, the relative proportions of different species could account for needs being met. For example, if a household intends to harvest a certain amount of Chinook salmon, but catches more chum or sockeye salmon, they may process those other species, and once their rack is full, may not harvest more Chinook to increase the total catch for that "preferred" species.

For all of the reasons discussed above, using the proportion of households that met their harvest needs to draw conclusions about the *amount* of salmon harvested may be of little value, because for instance, in 2009, 35% less fish were harvested overall, but 25% *more* people reported meeting their needs in 2009 than 2008.

Though the qualitative data about whether or not people met their needs does not describe the experiences from individual households within and among subregions, it indicates that despite changes in levels of subsistence harvest, that majority of respondents were able to meet their subsistence salmon needs in both years reported here. But it is important to reiterate that in a given year, the number of salmon caught and the number of salmon needed may fluctuate naturally, and it is not possible to ascertain why these fluctuations occur, certainly not within the scope of this study.

REPORTED AND ESTIMATED HARVEST OF NON-SALMON SPECIES

The reported values for non-salmon species should not be compared among years, because they are not expanded estimates, and thus the amounts harvested are greatly affected by the fact that in 2009 many more people were surveyed. Also, the 2008 whitefish harvest categorized by "large" and "small" should not be compared with data in 2009 when categories included more specifically "humpback,""broad," and "cisco" whitefish. The harvest of most whitefish, pike, blackfish and other non-salmon species usually occurs in fall, winter and spring, many months prior to the salmon season and the survey period. Not only may it be hard for fishermen to remember specific harvests of these fish, but they may not know exactly how many of each species they caught, or may not be familiar with the names of the species. To help offset this, beginning in 2009, surveyors used color photos of the species of fish, labeled with Yupik names, when asking the question about harvest of non-salmon species. Though this helped people know which species surveyors were referring to, it may not help with estimation of specific harvest totals overall. The non-salmon harvest answers that respondents give often seem less specific or accurate than salmon harvests which have occurred more recently. Salmon harvests furthermore may span a shorter period of time, and include smaller numbers of fish. For example, people may report harvests of blackfish or smelt, which are small, by the bucketful. The surveyors are trained to help respondents to try to estimate numbers of fish, but the precision of these estimates are not as good as those for salmon, for which people often remember the exact number of each species they harvested (particularly if they recorded their daily catch on a harvest calendar).

LOST FISH

In 2008 and 2009, the same percentage of respondents (3%) indicated losing salmon for human consumption, with 83% of these respondents citing animals or weather-related factors as the cause for the losses. The total amount of lost fish reported was less than 1% of the total salmon harvest. This question may seem intrusive to some users who often pride themselves on their harvest practices and preservation techniques. Respondents may feel that if any fish were lost, it will be perceived as wasted, so the question was always asked with sensitivity. Often, fish that have spoiled, or have been partially eaten by animals, are fed to dogs. Households may go out and fish for more salmon to replace lost fish, but this was verified when surveying, and extra harvest to replace lost fish was accounted for in the overall harvest estimate. Because the fish 'lost' are reported and not expanded to the entire community, comparisons of total number of lost fish should be avoided between years, as they are affected by the number of people interviewed and the number responding to the question. However, the data show that in 2008 and 2009, lost fish was an insignificant problem overall, only affecting a few households and communities.

The main objective of this study was to estimate subsistence salmon harvest (via postseason household surveys) for all participating communities within the Kuskokwim Area, and this objective was met in 2008. Sample sizes, precision, and efficiency of project operations improved further in 2009. In light of changes to methodology beginning in 2008 for the estimation of subsistence salmon harvest, historical estimates (1990 to 2007) are not reported here. Limited conclusions should be made about the 2008 and 2009 estimated salmon harvest and any harvest trends, until these estimates can be compared with revised historical estimates.

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REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 2011. Community subsistence information database. Division of Subsistence, Anchorage. < http://www.subsistence.adfg.state.ak.us/CSIS/>.

AFN (Alaska Federation of Natives). 2011. Alaska Federation of Natives guidelines for research. http://www.ankn.uaf.edu/iks/afnguide.html.

Andrews, E. F. 1988. The harvest of fish and wildlife for subsistence by residents of Minto, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 137, Juneau.

Andrews, E., and M. Coffing. 1986. Kuskokwim River subsistence Chinook fisheries: an overview. Report to the Alaska Board of Fisheries, Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 146, Juneau.

Borba, B. M., and H. H. Hamner. 2001. Subsistence and personal use salmon harvest estimates Yukon Area, 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A01-27. Anchorage.

Brodersen, N. B. and H. C. Carroll. 2011. Activities of the Kuskokwim River salmon management working group, 2010. Alaska Department of Fish and Game, Fishery Management Report No. 11-45, Anchorage.

Busher, W. H., T. Hamazaki, and A. M. Marsh. 2007. Subsistence and personal use salmon harvests in the Alaskan portion of the Yukon River Drainage, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 07-52, Anchorage.

Dull, B. S., and C. A. Shelden. 2007. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2006. Alaska Department of Fish and Game, Fishery Management Report No. 07-50, Anchorage.

Fall, J. A., C. Brown, M. F. Turek, N. Braem, J. J. Simon, D. L. Holen, L. Naves, L. Hutchinson-Scarbrough, T. Lemons, V. Ciccone, T. Krieg, and D. Koster. 2009. Alaska subsistence salmon fisheries 2007 annual report. Alaska Department of Fish and Game, Division of Subsistence, Techncial Paper No. 346, Juneau.

Francisco, R. K., C. Burkey Jr., D. B. Molyneaux, C. J. Anderson, H. H. Hamner, D. J. Schneiderhan, M. W. Coffing, R. J. Walker, and K. E. Hyer. 1990. Annual management report, Kuskokwim area, 1989. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3B90-25, AYK Region, Anchorage.

Francisco, R. K., K. Schultz, D. J. Schneiderhan, D. Huttunen, C. Burkey, Jr., H. H. Hamner, and R. Walker. 1989. Annual management report, Kuskokwim area, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3B89-08, AYK Region, Anchorage.

Hamazaki, T. 2011. Reconstruction of subsistence salmon harvests in the Kuskokwim Area, 1990–2009. Alaska Department of Fish and Game, Fishery Manuscript Series No. 11-09, Anchorage.

Honaker, J., and G. King. 2010. What to do about missing values in time-series cross-section data. American Journal of Political Science 54:561-581.

Jallen, D. M., and T. Hamazaki. 2011. Subsistence and personal use salmon harvests in the Alaska portion of the Yukon River Drainage, 2009. Alaska Department of Fish and Game, Fishery Data Series No. 11-07, Anchorage.

Jonrowe, M., R. Baxter, and D. Schneiderhan. 1979. Annual salmon management report, 1979, Kuskokwim District. Alaska Department of Fish and Game, Division of Commercial Fisheries, Bethel and Anchorage.

REFERENCES CITED (Continued)

King, G., H. Honaker, A. Joseph, and K. Scheve. 2001. Analyzing incomplete political science data: An alternative algorithm for multiple imputation. American Political Science Review 95:49-69.

Krauthoefer, T. 2005. Performance report for Project Number 05-356. Submitted to the FWS, OSM, Fisheries Resources Monitoring Program December 1, 2005, by Alaska Department of Fish and Game, Division of Subsistence, Anchorage.

Lunn, D. J., A. Thomas, N. Best, and D. Spiegelhalter. 2000. WinBUGS -- A Bayesian modeling framework: Concepts, structure, and extensibility. Statistics and Computing 10:325-337.

Magdanz, J. S., C. J. Utermohle, and R. J. Wolfe. 2002. The organization of subsistence food production in two Inupiaq communities, Wales and Deering, Alaska. Alaska Department of Fish and Game, Division of Subsistence,, Technical Paper No. 259, Juneau.

Patton, E. and H.C. Carroll. *In prep*. Inseason subsistence salmon catch monitoring, Lower Kuskokwim River, 2010. Alaska Department of Fish and Game, Fishery Management Report No., Anchorage.

Regnart, R. I., R. Baxter, and C. Yanagawa. 1970. Annual management report, 1969, Arctic-Yukon-Kuskokwim Area. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Sahlins, M D. 1972. Stone age economics. Aldine Publishing Company, New York.

Scheaffer, R. L., and W. Mendenhall, L. Ott. 1999. Elementary survey sampling. 4th edition. PWS-Kent, Boston.

Simon, J., T. Krauthoefer, D. Koster, and D. Caylor. 2007. Subsistence salmon harvest monitoring report, Kuskokwim Fisheries Management Area, Alaska, 2004. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 313. Juneau.

Sumida, V. A. 1989. Patterns of fish and wildlife harvest and use in Beaver, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 140, Juneau, AK.

Sumida, V. A, and D. B. Andersen. 1990. Patterns of fish and wildlife use for subsistence in Fort Yukon, Alaska. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 179. Juneau, AK.

Walker, R. J., and M. W. Coffing. 1993. Subsistence salmon harvests in the Kuskokwim Area during 1989. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 287, Juneau.

Wolfe, R. J. 1987. The Super-Household: Specialization in Subsistence Economies, Paper presented at the 14th Annual Meeting of the Alaska Anthropological Association, March 12-13, 1987, Anchorage, AK.

Wolfe, R. J., C. L. Scott, W. E. Simeone, C. J. Utermohle, and M. C. Pete. 2007. The "Super-Household" in Alaska Native subsistence economics. National Science Foundation, ARC 0352677. Washington DC. 31 pages.

TABLES AND FIGURES

Table 1.–Kuskokwim area communities by geographic location.

North Kuskokwim Bay	Kipnuk*
	Kwigillingok*
	Kongiganak
Lower Kuskokwim	Tuntutuliak
	Eek
	Kasigluk
	Nunapitchuk
	Atmautluak
	Napakiak
	Napaskiak
	Oscarville
	Bethel
	Kwethluk
	Akiachak
	Akiak
	Tuluksak
Middle Kuskokwim	Lower Kalskag
	Upper Kalskag
	Aniak
	Chuathbaluk
Upper Kuskokwim	Crooked Creek
	Red Devil
	Sleetmute
	Stony River
	Lime Village
	McGrath
	Takotna
	Nikolai
	Telida
South Kuskokwim Bay	Quinhagak
	Goodnews Bay
	Platinum
Bering Sea Coast	Mekoryuk*
	Newtok*
	Nightmute*
	Toksook Bay*
	Tununak*
	Chefornak*

Note: An asterisk means that the community was not surveyed because they chose to not participate in the study.

Figure 1.–Kuskokwim management area showing communities.

Date of Survey _____
Person Interviewed _____
Relation to HH _____

Interviewer _____

HHID #

Community:

2009 Kuskokwim Area Post-Season Subsistence Salmon Harvest Survey
CONFIDENTIAL INFORMATION

1. **We would like to make sure we have the correct name and address for your household.**

Head of Household _____
Mailing Address _____ Telephone _____
Permanent Note _____ _____
Significant Other _____ _____

2. **How many people live in your household?** _____
3. **Did anyone in your household harvest salmon for subsistence use OR keep fish for subsistence use from commercial fishing?** Yes ____ No ____ (Salmon caught during commercial openings but retained for subsistence. Harvest includes catching or cutting salmon) IF YES, COMPLETE ALL OF PART I, otherwise go to PART II.

Adult household member declined to be interviewed. [ ] Reason given: _____

I. HOUSEHOLDS THAT CAUGHT SALMON

4. **May I have your salmon catch calendar?** Yes ____ No ____ Already sent in ____ (Are all fish harvested on calendar?)
5. **How many total salmon did you or your fishing group harvest this year?** (Group may include other households)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

6. **How many households help catch these fish?** _____ (Names) _____

_____

*7. **Where did you catch your salmon? How many salmon did YOUR HOUSEHOLD keep for subsistence purposes?**
(Include only fish caught by this household, not the group, includes fish kept from commercial periods.)

Kusko mouth up to include bethel (K1) Above Bethel up to include Aniak (K2) Above Jacksmith Bay up to mouth (K4)

Below Jacksmith Bay (K 5) Nelson Is. above Kolavinarak River (N) Nelson Is. below Kokav.River to Kusko mouth (S)

Crooked Cr. ↓ Sleetmute ↓ Holitna R. Stony R. ↓ McGrath ↓ Above McGrath Other_____

Area _____ CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Area _____ CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Total (two areas) CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

8. **What is your household's primary type of salmon fishing gear?** (In order of importance, 1= primary)

SET NET _____ DRIFT NET _____ FISH WHEEL _____ HOOK & LINE _____ DIPNET_____ OTHER _____

9. **How many fish were kept from commercial fishing for subsistence use?** (___ Did not commercial fish)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

10. **Did your household "lose" any salmon? (e.g. to bears, birds, flies, spoilage, diseased fish, etc.)**
(If fish was not fit for humans but was fed to dogs, then it was not "lost.")

CHINOOK _____ SOCKEYE_____ CHUM _____ COHO _____ PINK_____

Reason(s) for loss: _____

11. **Did your household give away any salmon to other households?** (names, species, and numbers)

_____

_____

Figure 2.–Kuskokwim area postseason subsistence harvest survey form, 2009.

PART II. ALL HOUSEHOLDS

12. **Did your household receive any salmon? Yes ____ No ____ Code: S=Subsistence, C=Commercial, T=Test Fish

Code: _____ Fishermen/Project (Name) _____

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Code: _____ Fishermen/Project (Name) _____

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

13. HOUSEHOLDS THAT FISHED: **How many salmon does your household usually/would like to harvest?**

ALL HOUSEHOLDS: **How many salmon does your household usually/would like to receive? (Did you meet your needs?)**

CHINOOK_____ If less, why? _____

SOCKEYE_____ If less, why? _____

CHUM _____ If less, why? _____

COHO_____ If less, why? _____

14. Did your household catch any other fish besides salmon? Yes _____ No _____

(Harvest numbers should include from September/October of last year to now.)

HUMPBACK WHITEFISH _____ BROAD WHITEFISH _____ CISCO_____SHEEFISH _____ LUSH _____

PIKE_____ BLACKFISH_____ GRAYLING _____ SMELT _____ CHAR _____ RAINBOW TROUT _____

HERRING _____

15. How many dogs does your household have? _____ (if zero go to question 18)

16. Do you feed whole salmon to your dogs? Yes _____ No _____ Only Feed Scraps ____ (if "No" go to question 18)

17. How many whole salmon were put up for dogs this year by species (numbers should represent whole fish, not scraps):

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

18. Additional Comments:

_____

_____

THANK YOU! THIS INFORMATION IS USED TO DOCUMENT THE SUBSISTENCE SALMON HARVEST WITHIN THE KUSKOKWIM AREA AND TO TRY TO ENSURE THERE WILL BE ENOUGH SALMON FOR THE FUTURE.

Surveyor Comments:

Official Use - This area is to be filled in by Surveyor.

HOUSEHOLD'S TOTAL SUBSISTENCE SALMON CATCH (Totals from question *7 or zeros if non-fisher)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Complete Survey _____ Partial Survey _____ No Survey _____

Figure 2.–Page 2 of 2.

Date of Survey _____
Person Interviewed _____
Relation to HH _____

Interviewer _____

Community	LABEL	HHID#
Head of Household	LABEL	
Mailing Address	LABEL	Telephone#
Significant Other	LABEL	

2008 Kuskokwim Area Post-Season Subsistence Salmon Harvest Survey

CONFIDENTIAL INFORMATION

1. **We would like to make sure we have the correct name and address for your household.**

Head of Household _____
Mailing Address _____ Telephone _____
Permanent Note _____
Significant Other _____
Permanent Note _____

2. **How many people live in your household?** _____

3. **Did anyone in your household catch salmon for subsistence use this year?** Yes ____ No ____ (If "No," go to area II)
Includes salmon caught during commercial openings but retained for subsistence. IF YES, COMPLETE ALL OF PART ONE.

Adult household member declined to be interviewed. [ ] Reason given: _____

I. HOUSEHOLDS THAT CAUGHT SALMON

4. **May I have your salmon catch calendar?** Yes ____ No ____ Already sent in ____ (Are all fish harvested on calendar?)

5. **How many total salmon did you or your fishing group catch this year?** (Group may include other households)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

6. **How many households help catch these fish?** _____ (Names) _____

_____

*7. **How many total salmon did your household catch for subsistence purposes this year?**
(Include only fish caught by this household, not the group, includes fish kept from commercial periods.)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

8. **Did you or anyone in this household commercial fish this year?** Yes _____ No _____

9. **If Yes.** How many salmon caught during commercial openings did your household keep for subsistence use?

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

10. **Did your household "lose" any salmon? (e.g. to bears, birds, spoilage, diseased fish, etc.)**
(If fish was not fit for humans but was fed to dogs, then it was not "lost.")

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

11. **How many salmon did you keep for your household's use? (do not include fish given away or 'lost")

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

12. **Did your household share the salmon catch with any other households?** (names, species, and numbers)

_____

_____

13. **Where do you catch your subsistence salmon?** (Circle all that apply and show harvest by area if more than one)

Kuskokwim Bay (S or N) Nelson Is. (S or N) 1 2 4 5 Crooked Cr. (↑ or ↓) Sleetmute (↑ or ↓) Holitna R.
Stony R. (↑ or ↓) McGrath (↑ or ↓) OTHER_____
Area _____ CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____
Area _____ CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

14. **What is your household's primary type of salmon fishing gear?** (In order of importance 1= primary)

SET NET _____ DRIFT NET _____ FISH WHEEL _____ HOOK & LINE _____ DIPNET_____ OTHER _____

Figure 3.–Kuskokwim area postseason subsistence salmon harvest survey form, 2008.

II. ALL HOUSEHOLDS

15. Did your household catch any other fish besides salmon? Yes _____ No _____
(Harvest numbers should include from September/October of last year to now. Large Whitefish are 4 pounds or greater.)

LG WHITEFISH _____ SM WHITEFISH _____ SHEEFISH _____ BURBOT _____ PIKE _____ BLACKFISH _____

GRAYLING _____ SMELT _____ CHAR _____ RAINBOW TROUT _____ HERRING _____

****16. Was your household given any salmon? Yes ____ No ____** Code: S=Subsistence, C=Commercial, T=Test Fish

Code: _____ Fishermen/Project (Name) _____

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Code: _____ Fishermen/Project (Name) _____

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

17. How many dogs (including puppies) does your household have? _____ (if "No" on questions 3 and 16 go to question 22)

18. Do you feed whole salmon to your dogs? Yes _____ No _____ Only Feed Scraps ____ (if "No" go to question 21)

19. Were any of the salmon put up for the dogs from the commercial fishery? Yes _____ No _____

20. Estimate harvest of salmon put up for dogs this year by fishery (numbers should represent whole fish, not scraps):

(subsistence) CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

(commercial) CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

21. How successful was your household in meeting its subsistence salmon needs? (indicate percent success with "x")
"No Need" means there was no harvest or use of a species because there was no need for the species, e.g. species may not be traditionally fished in that area or respondent may not wish to harvest the species.

(No Need)

☐ CHINOOK ___(100%) ___(75%) ___ (50%) ___(25%) ___(0%) If poor, why? _____

☐ SOCKEYE ___(100%) ___(75%) ___ (50%) ___(25%) ___(0%) If poor, why? _____

☐ CHUM ___(100%) ___(75%) ___ (50%) ___(25%) ___(0%) If poor, why? _____

☐ COHO ___(100%) ___(75%) ___ (50%) ___(25%) ___(0%) If poor, why? _____

22. Additional Comments: _____

_____

_____

_____

_____

THANK YOU! THIS INFORMATION IS USED TO DOCUMENT THE SUBSISTENCE SALMON HARVEST WITHIN THE KUSKOKWIM AREA AND TO TRY TO ENSURE THERE WILL BE ENOUGH SALMON FOR THE FUTURE.

Surveyor Comments:

Official Use - This area is to be filled in by Fish and Game.

HOUSEHOLD'S TOTAL SUBSISTENCE SALMON CATCH (Totals from question *7)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

HOUSEHOLD'S TOTAL SUBSISTENCE SALMON USE (Add totals from questions **11 and **16)

CHINOOK _____ SOCKEYE _____ CHUM _____ COHO _____ PINK _____

Complete Survey _____ Partial Survey _____ No Survey _____

Figure 3.–Page 2 of 2.

APPENDIX A: DEMOGRAPHICS

Appendix A1.–Total number of Households (*N*), number selected for survey (S), number selected and surveyed (ns), number of unselected houses that were surveyed (U) and the proportion of selected households surveyed (PS), based on random stratification of user groups in communities surveyed, Kuskokwim area, 2008.

	Unknown					Does not Usually Harvest					Usually Harvest					Combined				
Community	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS
Kipnuk	105	56	0	-	0%	-	-	-	-	-	23	16	0	-	0%	128	72	0	-	0%
Kwigillingok	69	29	0	-	0%	-	-	-	-	-	2	1	0	-	0%	71	30	0	-	0%
Kongiganak	5	3	0	-	0%	4	1	0	-	0%	74	38	22	1	58%	83	42	22	1	52%
N. Kuskokwim Bay	179	88	0	-	0%	4	1	0	-	0%	99	55	22	1	40%	282	144	22	1	15%
Tuntutuliak	13	12	0	-	0%	3	2	0	-	0%	76	32	0	-	0%	92	46	0	-	0%
Eek	8	5	0	-	0%	8	3	0	-	0%	69	41	0	-	0%	85	49	0	-	0%
Kasigluk	41	8	7	1	88%	4	3	2	0	67%	53	27	18	2	67%	98	38	27	3	71%
Nunapitchuk	9	7	0	-	0%	11	3	0	-	0%	91	40	0	-	0%	111	50	0	-	0%
Atmautluak	9	9	0	-	0%	4	1	0	-	0%	53	30	0	-	0%	66	40	0	-	0%
Napakiak	17	17	7	0	41%	3	1	1	0	100%	70	35	24	1	69%	90	53	32	1	60%
Napaskiak	12	7	3	1	43%	9	3	2	0	67%	80	38	24	0	63%	101	48	29	1	60%
Oscarville	0	-	-	-	-	0	-	-	-	-	19	19	8	0	42%	19	19	8	0	42%
Bethel	-	-	-	-	0%	-	-	-	-	-	1,981	946	439	8	46%	1,981	946	439	8	46%
Kwethluk	13	9	3	0	33%	17	3	2	0	67%	126	45	27	1	60%	156	57	32	1	56%
Akiachak	16	6	3	0	50%	9	4	4	0	100%	123	51	29	1	57%	148	61	36	1	59%
Akiak	12	11	3	0	27%	3	1	1	1	100%	60	32	17	3	53%	75	44	21	4	48%
Tuluksak	11	4	1	0	25%	5	1	0	-	0%	62	37	19	4	51%	78	42	20	4	48%
Lower Kuskokwim Bay	161	95	27	2	28%	76	25	12	1	48%	2,863	1,373	605	20	44%	3,100	1,493	644	23	43%
Lower Kalskag	10	1	0	-	0%	12	4	2	0	50%	67	30	15	0	50%	89	35	17	0	49%
Upper Kalskag	5	3	0	-	0%	6	4	4	0	100%	41	25	15	1	60%	52	32	19	1	59%
Aniak	-	-	-	-		-	-	-	-	-	177	177	100	0	56%	177	177	100	0	56%
Chuathbaluk	11	4	3	0	75%	1	1	1	0	100%	26	16	8	0	50%	38	21	12	0	57%
Middle Kuskokwim	26	8	3	0	38%	19	9	7	0	78%	311	248	138	1	56%	356	265	148	1	56%

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	Unknown					Does not Usually Harvest					Usually Harvest					Combined				
Community	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS
Crooked Creek	14	13	8	0	62%	1	1	1	0	100%	24	15	8	0	53%	39	29	17	0	59%
Red Devil	4	4	1	0	25%	5	5	1	0	20%	9	9	5	0	56%	18	18	7	0	39%
Sleetmute	6	6	0	-	0%	4	4	3	0	75%	21	21	10	0	48%	31	31	13	0	42%
Stony River	3	3	0	-	0%	1	1	1	0	100%	15	15	8	0	53%	19	19	9	0	47%
Lime Village	3	1	0	-	0%	1	0	0	-	0%	8	7	0	-	0%	12	8	0	-	0%
McGrath	25	16	2	1	13%	39	18	5	1	28%	55	28	17	0	61%	119	62	24	2	39%
Takotna	9	9	0	-	0%	7	7	0	-	0%	9	9	0	-	0%	25	25	0	-	0%
Nikolai	7	1	1	0	100%	1	1	1	0	100%	19	14	9	4	64%	27	16	11	4	69%
Telida	1	1	0	-	0%	-	-	-	-	-	1	1	0	-	0%	2	2	0	-	0%
Upper Kuskokwim	72	54	12	1	22%	59	37	12	1	32%	161	119	57	4	48%	292	210	81	6	39%
Kuskokwim River Total	438	245	42	3	17%	158	72	31	2	43%	3,434	1,618	722	126	45%	4,030	1,935	795	131	41%
Quinhagak	25	20	9	0	45%	13	3	2	0	67%	134	60	32	3	53%	172	83	43	3	52%
Goodnews Bay	11	8	3	1	38%	3	1	0	-	0%	55	23	15	1	65%	69	32	18	2	56%
Platinum	2	2	1	0	50%	1	1	0	-	0%	14	14	9	0	64%	17	17	10	0	59%
S. Kuskokwim Bay	38	30	13	1	43%	17	5	2	0	40%	203	97	56	4	58%	258	132	71	5	54%
Mekoryuk	36	14	0	-	0%	1	1	0	-	0%	26	10	0	-	0%	63	25	0	-	0%
Newtok	78	47	0	-	0%	1	0	0	-	0%	-	-	0	-	0%	79	47	0	-	0%
Nightmute	50	29	0	-	0%	-	-	0	-	0%	-	-	0	-	0%	50	29	0	-	0%
Toksook Bay	20	20	0	-	0%	28	8	0	-	0%	66	37	0	-	0%	114	65	0	-	0%
Tununak	60	37	0	-	0%	1	1	0	-	0%	-	-	0	-	0%	61	38	0	-	0%
Chefornak	78	8	0	-	0%	-	-	0	-	0%	1	0	0	-	0%	79	8	0	-	0%
Bering Sea Coast	322	155	0	-	0%	31	10	0	-	0%	93	47	0	-	0%	446	212	0	-	0%
Total	798	430	55	4	13%	206	87	33	2	38%	3,730	1,939	878	30	45%	4,734	2,456	966	36	39%

Note: Kuskokwim River Total includes Lower, Middle and Upper Kuskokwim regions and North Kuskokwim Bay. For the Unknown user group, the number selected (S) should be equal to 100% of the unknown households in 2007, but total *N* in 2008 will be higher than column 'S' as surveyors discover new households when they arrive in the village, and those households are automatically 'Unknown', and are sampled if possible. In contrast the use group designations do not reflect changes found in the current year for 'usually fish' and 'usually do not fish' households changes in those use groups will appear in 2009, when the families database is rolled over and selections are made prior to surveying in that season. In Aniak, households are not stratified by user group because a census sample is attempted each year.

Appendix A2.–Total number of Households (*N*), number selected for survey (S), number selected and surveyed (ns), number of unselected houses that were surveyed (U) and the proportion of selected households surveyed (PS), based on random stratification of user groups in communities surveyed, Kuskokwim area, 2009.

	Unknown					Does not Usually Harvest					Usually Harvest					Combined				
Community	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS
Kipnuk	89	89	0	-	0%	-	-	-	-	-	59	25	0	-	0%	148	114	0	-	0%
Kwigillingok	-	-	-	-	-	-	-	-	-	-	71	35	0	-	0%	71	35	0	-	0%
Kongiganak	6	3	2	2	67%	7	3	2	0	67%	79	38	27	7	71%	92	44	31	9	70%
N. Kuskokwim Bay	95	92	2	2	2%	7	3	2	0	67%	209	98	27	7	28%	311	193	31	9	16%
Tuntutuliak	5	5	3	0	60%	4	2	2	0	100%	73	35	26	2	74%	82	42	31	2	74%
Eek	8	8	7	0	88%	11	4	2	0	50%	58	28	24	1	86%	77	40	33	1	83%
Kasigluk	5	1	1	1	100%	4	2	0	1	0%	86	36	26	14	72%	95	39	27	16	69%
Nunapitchuk	4	0	0	2	0%	12	5	3	1	60%	98	47	34	3	72%	114	52	37	6	71%
Atmautluak	7	6	5	0	83%	3	2	1	1	50%	57	28	23	2	82%	67	36	29	3	81%
Napakiak	15	9	4	5	44%	5	2	0	-	0%	80	42	31	1	74%	100	53	35	6	66%
Napaskiak	6	0	0	6	0%	12	2	0	1	0%	80	43	32	4	74%	98	45	32	11	71%
Oscarville	4	4	4	0	100%	-	-	-	-	-	13	13	6	0	46%	17	17	10	0	59%
Bethel	-	-	-	-	-	-	-	-	-	-	2,005	991	347	352	35%	2,005	991	347	352	35%
Kwethluk	4	0	0	-	0%	20	9	5	0	56%	133	65	52	1	80%	157	74	57	1	77%
Akiachak	8	2	2	4	100%	9	4	1	0	25%	124	61	47	2	77%	141	67	50	6	75%
Akiak	10	9	7	1	78%	2	2	0	-	0%	68	36	28	1	78%	80	47	35	2	74%
Tuluksak	9	0	0	5	0%	8	3	1	1	33%	69	27	20	8	74%	86	30	21	14	70%
Lower Kuskokwim Bay	85	44	33	24	75%	90	37	15	5	41%	2,944	1,452	696	391	48%	3,119	1,533	744	420	49%
Lower Kalskag	3	2	1	1	50%	12	5	3	0	60%	56	25	21	0	84%	71	32	25	1	78%
Upper Kalskag	11	9	5	1	56%	11	7	3	1	43%	44	22	17	3	77%	66	38	25	5	66%
Aniak	-	-	-	-	-	-	-	-	-	-	183	183	168	0	92%	183	183	168	0	92%
Chuathbaluk	3	1	1	0	100%	2	2	2	0	100%	32	30	21	1	70%	37	33	24	1	73%
Middle Kuskokwim	17	12	7	2	58%	25	14	8	1	57%	315	260	227	4	87%	357	286	242	7	85%

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	Unknown					Does not Usually Harvest					Usually Harvest					Combined				
Community	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS	*N*	S	ns	U	PS
Crooked Creek	1	1	0	-	0%	2	2	2	0	100%	38	36	24	2	67%	41	39	26	2	67%
Red Devil	1	0	0	-	0%	6	6	2	0	33%	7	7	3	0	43%	14	13	5	0	38%
Sleetmute	9	2	1	7	50%	4	4	2	0	50%	25	24	18	1	75%	38	30	21	8	70%
Stony River	5	2	2	1	100%	2	1	1	1	100%	13	13	7	0	54%	20	16	10	2	63%
Lime Village	2	2	0	-	0%	3	3	0	-	0%	10	10	0	-	0%	15	15	0	-	0%
McGrath	35	4	3	10	75%	40	16	15	1	94%	74	33	24	5	73%	149	53	42	16	79%
Takotna	4	4	0	-	0%	7	7	0	-	0%	14	14	0	-	0%	25	25	0	-	0%
Nikolai	4	0	0	2	0%	1	1	1	0	100%	27	27	24	0	89%	32	28	25	2	89%
Telida	-	-	-	-	-	1	1	0	-	0%	1	1	0	-	0%	2	2	0	-	0%
Upper Kuskokwim	61	15	6	20	40%	66	41	23	2	56%	209	165	100	8	61%	336	221	129	30	58%
Kuskokwim River Total	258	163	48	48	29%	188	95	48	8	51%	3,677	1,888	965	495	51%	4,123	2,146	1,061	551	49%
Quinhagak	14	13	8	1	62%	14	10	7	0	70%	123	62	54	5	87%	151	85	69	6	81%
Goodnews Bay	2	0	0	2	0%	6	4	4	0	100%	58	26	21	1	81%	66	30	25	3	83%
Platinum	-	-	-	-	-	2	2	1	0	50%	15	15	13	0	87%	17	17	14	0	82%
S. Kuskokwim Bay	16	13	8	3	62%	22	16	12	0	75%	196	103	88	6	85%	234	132	108	9	82%
Mekoryuk	-	-	-	-	-	5	3	0	-	0%	57	28	0	-	0%	62	31	0	-	0%
Newtok	-	-	-	-	-	1	1	0	-	0%	78	39	0	-	0%	79	40	0	-	0%
Nightmute	9	9	0	-	0%	-	-	-	-	-	46	23	0	-	0%	55	32	0	-	0%
Toksook Bay	8	8	0	-	0%	26	11	0	-	0%	80	40	0	-	0%	114	59	0	-	0%
Tununak	-	-	-	-	-	1	1	0	-	0%	60	30	0	-	0%	61	31	0	-	0%
Chefornak	6	6	0	-	0%	-	-	-	-	-	76	38	0	-	0%	82	44	0	-	0%
Bering Sea Coast	23	23	0	-	0%	33	16	0	-	0%	397	198	0	-	0%	453	237	0	-	0%
Total	297	199	56	51	28%	243	127	60	8	47%	4,270	2,276	1,138	416	50%	4,810	2,602	1,254	475	48%

Note: Kuskokwim River Total includes Lower, Middle and Upper Kuskokwim regions and North Kuskokwim Bay. For the Unknown user group, the number selected (S) should be equal to 100% of the unknown households in 2007, but total *N* in 2008 will be higher than column 'S' as surveyors discover new households when they arrive in the village, and those households are automatically 'Unknown', and are sampled if possible. In contrast the use group designations do not reflect changes found in the current year for 'usually fish' and 'usually do not fish' households changes in those use groups will appear in 2009, when the families database is rolled over and selections are made prior to surveying in that season. In Aniak, households are not stratified by user group because a census sample is attempted each year.

Appendix A3.–Estimated number of households that subsistence fished, for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	105	0	-	-	-	-	-	-	23	0	-	-	128	0	-	-
Kwigillingok	69	0	-	-	-	-	-	-	2	0	-	-	71	0	-	-
Kongiganak	5	0	-	-	4	0	-	-	74	23	78%	0.07	83	23	65	10
N. Kuskokwim Bay	179	0	-	-	4	0	-	-	99	23	78%	0.07	282	23	65	10
Tuntutuliak	13	0	-	-	3	0	-	-	76	0	-	-	92	0	-	-
Eek	8	0	-	-	8	0	-	-	69	0	-	-	85	0	-	-
Kasigluk	41	8	50%	0.17	4	2	50%	0.35	53	20	80%	0.07	98	30	65	14
Nunapitchuk	9	0	-	-	11	0	-	-	91	0	-	-	111	0	-	-
Atmautluak	9	0	-	-	4	0	-	-	53	0	-	-	66	0	-	-
Napakiak	17	7	43%	0.15	3	1	0%	-	70	25	64%	0.08	90	33	52	10
Napaskiak	12	4	75%	0.2	9	2	0%	0	80	24	63%	0.08	101	30	59	12
Oscarville	-	-	-	-	-	-	-	-	19	8	88%	0.1	19	8	17	3
Bethel	-	-	-	-	-	-	-	-	1,981	447	45%	0.02	1,981	447	886	68
Kwethluk	13	3	100%	0	17	2	50%	0.47	126	28	75%	0.07	156	33	121	18
Akiachak	16	3	67%	0.3	9	4	25%	0.19	123	30	87%	0.05	148	37	120	14
Akiak	12	3	67%	0.29	3	2	50%	0.29	60	20	85%	0.07	75	25	61	9
Tuluksak	11	1	100%	-	5	0	-	-	62	23	96%	0.03	78	24	75	5
Lower Kuskokwim	161	29	62%	0.09	76	13	21%	0.08	2,863	625	53%	0.02	3,100	667	1,454	75
Lower Kalskag	10	0	-	-	12	2	50%	0.46	67	15	60%	0.12	89	17	53	18
Upper Kalskag	5	0	-	-	6	4	25%	0.14	41	16	75%	0.09	52	20	36	7
Aniak	-	-	-	-	-	-	-	-	177	99	75%	0.03	177	99	132	9
Chuathbaluk	11	3	33%	0.28	1	1	0%	-	26	8	75%	0.14	38	12	23	8
Middle Kuskokwim	26	3	33%	0.28	19	7	21%	0.12	311	138	72%	0.03	356	148	245	22

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	14	8	50%	0.12	1	1	0%	-	24	8	75%	0.13	39	17	25	6
Red Devil	4	1	100%	-	5	1	0%	-	9	5	100%	0	18	7	13	0
Sleetmute	6	0	-	-	4	3	67%	0.17	21	10	70%	0.11	31	13	22	5
Stony River	3	0	-	-	1	1	0%	-	15	8	63%	0.13	19	9	11	4
Lime Village	3	0	-	-	1	0	-	-	8	0	-	-	12	0	-	-
McGrath	25	3	67%	0.31	39	6	17%	0.15	55	17	35%	0.1	119	26	43	19
Takotna	9	0	-	-	7	0	-	-	9	0	-	-	25	0	-	-
Nikolai	7	1	0%	-	1	1	100%	-	19	13	77%	0.07	27	15	16	2
Telida	1	0	-	-	-	-	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	72	13	55%	0.16	59	13	20%	0.12	161	61	60%	0.05	292	87	129	21
Kuskokwim River Total	438	45	58%	0.08	158	33	20%	0.08	3,434	847	55%	0.01	4,030	925	1,893	81
Quinhagak	25	8	50%	0.16	13	2	50%	0.46	134	35	74%	0.06	172	45	121	17
Goodnews Bay	11	4	50%	0.23	3	0	-	-	55	16	81%	0.08	69	20	52	10
Platinum	2	1	100%	-	1	0	-	-	14	9	56%	0.1	17	10	10	3
S. Kuskokwim Bay	38	13	53%	0.12	17	2	-	-	203	60	75%	0.05	258	75	184	20
Mekoryuk	36	0	-	-	1	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	322	0	-	-	31	0	-	-	93	0	-	-	446	0	-	-
Total	798	58	57%	0.07	206	35	20%	0.08	3,730	907	57%	0.01	4,734	1,000	2,077	83

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Propn. Is the estimated proportion of households from each group that fished, based on the number of households surveyed, and their responses to the question: "Did you subsistence fish?" Est. Total is the estimated number of households from all use groups that subsistence fished.

Appendix A4.–Estimated number of households that subsistence fished, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	75%	0.14	4	2	50%	0.35	82	31	61%	0.07	92	37	57	10
N. Kuskokwim Bay	95	4	75%	0.14	4	2	50%	0.35	212	31	61%	0.07	311	37	57	10
Tuntutuliak	5	3	33%	0.21	3	1	100%	-	74	29	83%	0.06	82	33	66	7
Eek	8	7	57%	0.07	7	2	0%	0	62	25	76%	0.07	77	34	52	7
Kasigluk	5	2	50%	0.39	3	0	-	-	87	41	66%	0.05	95	43	62	9
Nunapitchuk	5	3	33%	0.21	9	3	33%	0.27	100	38	68%	0.06	114	44	73	11
Atmautluak	7	5	40%	0.13	2	1	0%	-	58	26	65%	0.07	67	32	41	7
Napakiak	15	9	22%	0.09	4	0	-	-	81	32	75%	0.06	100	41	67	9
Napaskiak	6	6	50%	0	8	2	50%	0.43	84	36	86%	0.04	98	44	79	9
Oscarville	4	4	50%	0	-	-	-	-	13	6	100%	0	17	10	15	0
Bethel	-	-	-	-	-	-	-	-	2,005	699	47%	0.02	2,005	699	941	50
Kwethluk	5	0	-	-	17	3	0%	0	135	55	85%	0.04	157	58	119	9
Akiachak	8	6	67%	0.11	8	1	0%	-	125	49	84%	0.04	141	56	110	9
Akiak	10	8	88%	0.06	2	0	-	-	68	29	66%	0.07	80	37	55	8
Tuluksak	11	7	57%	0.12	4	1	100%	-	71	27	70%	0.07	86	35	60	9
Lower Kuskokwim	89	60	50%	0.04	67	14	24%	0.07	2,963	1,092	56%	0.01	3,119	1,166	1,739	57
Lower Kalskag	3	2	50%	0.29	10	3	0%	0	58	21	71%	0.08	71	26	43	8
Upper Kalskag	12	6	67%	0.15	7	4	25%	0.16	47	20	75%	0.08	66	30	45	7
Aniak	-	-	-	-	-	-	-	-	181	168	65%	0.01	181	168	119	3
Chuathbaluk	3	1	0%	-	1	1	0%	-	33	23	74%	0.05	37	25	24	3
Middle Kuskokwim	18	9	53%	0.11	18	8	10%	0.06	319	232	69%	0.02	355	249	231	11

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	*N*	*n*	Propn	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	2	1	100%	-	1	1	0%	-	38	26	46%	0.06	41	28	20	4
Red Devil	1	0	-	-	5	2	0%	0	8	3	100%	0	14	5	9	0
Sleetmute	9	8	63%	0.06	2	1	0%	-	27	20	70%	0.05	38	29	25	3
Stony River	5	3	33%	0.21	2	2	0%	0	13	7	86%	0.1	20	12	13	3
Lime Village	2	0	-	-	2	0	-	-	11	0	-	-	15	0	-	-
McGrath	36	13	15%	0.08	33	13	23%	0.09	80	32	41%	0.07	149	58	46	12
Takotna	4	0	-	-	6	0	-	-	15	0	-	-	25	0	-	-
Nikolai	4	2	100%	0	-	-	-	-	28	25	64%	0.03	32	27	22	2
Telida	-	-	-	-	-	-	-	-	2	0	-	-	2	0	-	-
Upper Kuskokwim	63	27	34%	0.06	51	19	18%	0.07	222	113	55%	0.03	336	159	133	13
Kuskokwim River Total	265	100	46%	0.03	140	43	21%	0.05	3,716	1,468	58%	0.01	4,121	1,611	2,160	61
Quinhagak	15	10	20%	0.08	12	6	33%	0.15	124	59	76%	0.04	151	75	102	9
Goodnews Bay	2	2	100%	0	3	2	0%	0	61	23	65%	0.08	66	27	42	8
Platinum	-	-	-	-	2	1	0%	-	15	13	69%	0.05	17	14	10	1
S. Kuskokwim Bay	17	12	29%	0.07	17	9	24%	0.11	200	95	72%	0.04	234	116	154	12
Mekoryuk	-	-	-	-	1	0	-	-	61	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	29	0	-	-	401	0	-	-	453	0	-	-
Total	305	112	44%	0.03	186	52	21%	0.04	4,317	1,563	58%	0.01	4,808	1,727	2,313	62

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Propn. Is the estimated proportion of households from each group that fished, based on the number of households surveyed, and their responses to the question: "Did you subsistence fish?" Est. Total is the estimated number of households from all use groups that subsistence fished.

Appendix A5.–Estimated number of people living in the Kuskokwim area, for communities surveyed, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	21	6.1	0.3	83	21	506	57
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	21	6.1	0.3	282	21	506	57
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	7	5.3	0.7	4	1	14	-	52	20	6.1	0.6	98	28	593	82
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	2.7	0.4	5	2	1.5	0.4	70	24	3.5	0.4	90	32	295	55
Napaskiak	4	3	5.3	0.4	14	2	2	0	83	23	5	0.5	101	28	511	88
Oscarville	-	-	-	-	-	-	-	-	19	8	5.4	0.8	19	8	102	29
Bethel	-	-	-	-	-	-	-	-	1,981	429	3.4	0.1	1,981	429	6,770	315
Kwethluk	9	3	2.7	0.5	20	2	3	0.9	127	28	4.9	0.5	156	33	735	132
Akiachak	6	0	-	-	13	3	1.3	0.3	129	29	4.3	0.4	148	32	593	96
Akiak	9	2	9	3.5	4	2	3	0.7	62	15	4.5	0.5	75	19	374	85
Tuluksak	2	1	6	-	11	0	-	-	65	20	5	0.4	78	21	389	56
Lower Kuskokwim	108	22	4.9	0.5	108	12	3.6	0.2	2,884	596	3.7	0.1	3,100	630	10,361	393
Lower Kalskag	-	-	-	-	17	1	1	-	72	14	3.6	0.5	89	15	324	88
Upper Kalskag	-	-	-	-	10	4	3.5	0.7	42	16	4.9	0.5	52	20	240	41
Aniak	-	-	-	-	-	-	-	-	177	98	3.1	0.1	177	98	547	40
Chuathbaluk	6	0	-	-	3	2	3	0.6	29	8	2.4	0.2	38	10	92	16
Middle Kuskokwim	6	0	-	-	30	7	3.4	0.5	320	136	3.4	0.1	356	143	1,204	106

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	2	0.4	3	3	2.7	0	25	8	3.4	0.5	39	17	114	27
Red Devil	1	0	-	-	7	1	1	-	10	6	3.8	0.8	18	7	48	17
Sleetmute	5	0	-	-	6	3	2.7	0.5	20	10	2.2	0.3	31	13	72	17
Stony River	-	-	-	-	2	1	2	-	17	8	3.4	0.6	19	9	61	21
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	4	-	46	6	2.2	0.4	68	19	3.1	0.3	119	26	331	55
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	1	-	20	14	3.9	0.4	27	15	97	18
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	2.6	0.3	79	15	2.1	0.3	178	65	3.2	0.2	292	87	723	72
Kuskokwim River Total	323	29	4.6	0.5	226	34	2.6	0.2	3,481	818	3.7	0.1	4,030	881	12,794	418
Quinhagak	15	8	4.1	0.4	19	2	4.5	0.5	138	33	5.6	0.4	172	43	944	119
Goodnews Bay	6	2	3.5	0.4	7	1	4	-	56	17	3.6	0.3	69	20	250	36
Platinum	2	1	9	-	1	0	-	-	14	9	3.4	0.3	17	10	70	10
S. Kuskokwim Bay	23	11	4.4	0.3	27	3	4	-	208	59	4.9	0.3	258	73	1,264	125
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	40	4.5	0.4	288	37	2.7	0.2	3,782	877	3.8	0.1	4,734	954	14,058	436

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix A6.–Estimated number of people living in the Kuskokwim area, for communities surveyed in 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	4	0.4	7	2	3	0.8	79	29	5.7	0.3	92	35	492	56
N. Kuskokwim Bay	95	4	4	0.4	7	2	3	0.8	209	29	5.7	0.3	311	35	492	56
Tuntutuliak	5	1	1	-	4	1	1	-	73	26	5.2	0.3	82	28	388	45
Eek	8	6	3.5	0.3	11	2	1	0	58	24	3.8	0.3	77	32	286	40
Kasigluk	5	2	3.5	1.9	4	1	1	-	86	37	5.9	0.3	95	40	528	48
Nunapitchuk	4	2	5.5	1.1	12	4	2.8	1.4	98	35	4.7	0.3	114	41	511	75
Atmautluak	7	4	4.8	0.3	3	2	3.5	0.9	57	23	4.9	0.4	67	29	324	43
Napakiak	15	9	2.6	0.4	5	0	-	-	80	29	4.3	0.3	100	38	403	48
Napaskiak	6	6	3.2	0	12	1	6	-	80	36	5.3	0.3	98	43	508	60
Oscarville	4	4	2.3	0	-	-	-	-	13	5	5	0.4	17	9	74	11
Bethel	-	-	-	-	-	-	-	-	2,005	691	3.3	0.1	2,005	691	6,688	206
Kwethluk	4	0	-	-	20	4	2.5	0.8	133	52	5	0.3	157	56	736	77
Akiachak	8	6	2.8	0.3	9	1	4	-	124	47	5	0.3	141	54	679	67
Akiak	10	8	3.6	0.3	2	0	-	-	68	26	5.5	0.5	80	34	418	62
Tuluksak	9	4	4.5	1	8	2	2	0.9	69	27	5.5	0.5	86	33	437	66
Lower Kuskokwim	85	52	3.4	0.2	90	18	2.6	0.4	2,944	1,058	3.9	0	3,119	1,128	11,982	284
Lower Kalskag	3	2	4.5	0.9	12	3	3.3	1	56	20	4.9	0.5	71	25	328	57
Upper Kalskag	11	6	3.3	0.3	11	4	5.8	0.4	44	17	4.3	0.4	66	27	289	35
Aniak	-	-	-	-	-	-	-	-	183	162	2.9	0.1	183	162	539	18
Chuathbaluk	3	1	2	-	2	1	3	-	32	21	3.2	0.3	37	23	116	18
Middle Kuskokwim	17	9	3.3	0.2	25	8	4.4	0.5	315	220	3.5	0.1	357	237	1,271	72

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	2.5	0	38	25	2.5	0.2	41	27	102	14
Red Devil	1	0	-	-	6	2	1	0	7	3	3.7	0.9	14	5	34	13
Sleetmute	9	8	2.6	0.3	4	1	1	-	25	19	2.7	0.2	38	28	96	11
Stony River	5	3	2	0.6	2	2	1	0	13	7	2.3	0.6	20	12	42	16
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	12	2.9	0.4	40	14	2.6	0.2	74	27	2.7	0.2	149	53	408	44
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	2	0.7	1	1	2	-	27	22	3.5	0.2	32	25	103	11
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	25	2.7	0.3	66	22	2.2	0.2	209	103	2.8	0.1	336	150	785	53
Kuskokwim River Total	258	90	3.2	0.1	188	50	2.8	0.2	3,677	1,410	3.8	0	4,123	1,550	14,529	303
Quinhagak	14	8	3	0.5	14	5	3.6	0.7	123	47	4.9	0.3	151	60	694	76
Goodnews Bay	2	2	1	0	6	3	4	1.8	58	21	2.8	0.2	66	26	189	35
Platinum	-	-	-	-	2	1	4	-	15	12	3.9	0.3	17	13	67	8
S. Kuskokwim Bay	16	10	2.8	0.4	22	9	3.7	0.6	196	80	4.2	0.2	234	99	950	84
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	100	3.1	0.1	243	59	2.9	0.2	4,270	1,490	3.8	0	4,810	1,649	15,479	314

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

APPENDIX B: SALMON HARVEST ESTIMATES

Appendix B1.–Estimated harvest of Chinook salmon, for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	22	25.1	7.8	83	22	2,086	1,267
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	22	25.1	7.8	282	22	2,086	1,267
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	9	17.2	6.7	4	1	0	-	52	20	42.4	5.1	98	30	2,928	762
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	20.5	9.3	5	2	0	0	70	24	26.8	5.2	90	32	2,183	767
Napaskiak	4	3	35.7	10.9	14	2	0	0	83	24	49.8	8.9	101	29	4,963	1,685
Oscarville	-	-	-	-	-	-	-	-	19	8	71.1	13.7	19	8	1,351	510
Bethel	-	-	-	-	-	-	-	-	1,981	446	17.8	1.8	1,981	446	35,205	7,130
Kwethluk	9	3	32.7	11.5	20	2	0.5	0.5	127	28	54.7	9.4	156	33	8,303	2,701
Akiachak	6	0	-	-	13	5	14	9.1	129	32	69.1	8.7	148	37	9,475	2,308
Akiak	9	3	125.3	82.8	4	2	10	7.1	62	20	37.5	9.7	75	25	3,493	1,876
Tuluksak	2	1	65	-	11	0	-	-	65	23	43.3	6.6	78	24	3,425	981
Lower Kuskokwim	108	25	33.6	10.1	108	14	8.5	4.7	2,884	625	25.4	1.6	3,100	664	71,327	8,498
Lower Kalskag	-	-	-	-	17	1	0	-	72	16	27.4	6.1	89	17	2,442	1,059
Upper Kalskag	-	-	-	-	10	4	12.5	9.7	42	16	50.4	11	52	20	2,241	926
Aniak	-	-	-	-	-	-	-	-	177	97	18.4	1.9	177	97	3,252	672
Chuathbaluk	6	0	-	-	3	2	0	0	29	10	22.8	7.5	38	12	785	504
Middle Kuskokwim	6	0	-	-	30	7	9.6	7.4	320	139	25	2.4	356	146	8,720	1,639

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	21.7	9.6	3	3	0	0	25	8	14.4	7.3	39	17	598	413
Red Devil	1	0	-	-	7	1	0	-	10	6	14.3	3.5	18	7	152	73
Sleetmute	5	0	-	-	6	3	1.7	1.2	20	10	26.5	9	31	13	644	421
Stony River	-	-	-	-	2	1	0	-	17	8	39.3	17.5	19	9	667	584
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	0	-	46	6	4.2	3.9	68	18	5.6	2.3	119	25	573	466
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	0	-	20	14	9	2.4	27	15	221	113
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	14.9	6.6	79	15	3.1	2.7	178	64	14.1	2.7	292	86	2,855	961
Kuskokwim River Total	323	32	30.6	8.5	226	36	5.2	2.3	3,481	850	24.8	1.4	4,030	918	84,987	8,800
Quinhagak	15	8	8.8	3.2	19	2	10	9.5	138	34	25.4	4.1	172	44	4,090	1,243
Goodnews Bay	6	2	0	0	7	1	30	-	56	17	15.2	3.4	69	20	1,060	369
Platinum	2	1	1	-	1	0	-	-	14	9	2.7	0.7	17	10	42	22
S. Kuskokwim Bay	23	11	5.8	2.1	27	3	30	-	208	60	21.1	2.9	258	74	5,192	1,297
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	43	25.8	6.9	288	39	6.8	2.1	3,782	910	24.6	1.3	4,734	992	90,179	8,895

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B2.–Estimated chum salmon harvest for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	22	19.2	6.7	83	22	1,592	1,086
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	22	19.2	6.7	282	22	1,592	1,086
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	9	8.2	2.5	4	1	0	-	52	20	25.6	5.7	98	30	1,677	614
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	44.2	21.5	5	2	0	0	70	24	16.4	4.4	90	32	1,809	876
Napaskiak	4	3	33.3	8.3	14	2	0	0	83	24	28	6.2	101	29	2,857	1,179
Oscarville	-	-	-	-	-	-	-	-	19	8	44	13.5	19	8	836	503
Bethel	-	-	-	-	-	-	-	-	1,981	446	9.4	1.4	1,981	446	18,660	5,572
Kwethluk	9	3	51.7	21.4	20	2	0	0	127	28	36.6	7.4	156	33	5,871	2,166
Akiachak	6	0	-	-	13	5	6	4.7	129	32	29.3	3.4	148	37	4,027	900
Akiak	9	3	108.3	47.6	4	2	30	21.2	62	20	29.9	10	75	25	2,949	1,485
Tuluksak	2	1	56	-	11	0	-	-	65	23	51.3	10.4	78	24	4,016	1,537
Lower Kuskokwim	108	25	33.2	7.2	108	14	7.6	4	2,884	625	14.7	1.3	3,100	664	42,700	6,626
Lower Kalskag	-	-	-	-	17	1	0	-	72	16	22.8	8.2	89	17	2,030	1,437
Upper Kalskag	-	-	-	-	10	4	15	11.6	42	16	38.1	14.8	52	20	1,751	1,236
Aniak	-	-	-	-	-	-	-	-	177	97	16	4.4	177	97	2,839	1,526
Chuathbaluk	6	0	-	-	3	2	0	0	29	10	17.6	6.4	38	12	606	432
Middle Kuskokwim	6	0	-	-	30	7	11.5	8.9	320	139	20.6	3.7	356	146	7,227	2,472

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	20	11	3	3	0	0	25	8	30	9.9	39	17	970	542
Red Devil	1	0	-	-	7	1	0	-	10	6	16.2	7.5	18	7	171	156
Sleetmute	5	0	-	-	6	3	1.7	1.2	20	10	14	4.2	31	13	346	199
Stony River	-	-	-	-	2	1	0	-	17	8	82.5	32.8	19	9	1,403	1,092
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	0	-	46	6	0	0	68	18	18.3	14.3	119	25	1,247	1,903
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	0	-	20	14	2.6	1	27	15	65	49
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	13.8	7.6	79	15	0.2	0.1	178	64	24.3	7.2	292	86	4,201	2,275
Kuskokwim River Total	323	32	30	6.1	226	36	3.4	1.5	3,481	850	15.9	1.2	4,030	918	55,720	7,508
Quinhagak	15	8	15	5.4	19	2	0	0	138	34	9.6	2.1	172	44	1,740	666
Goodnews Bay	6	2	0	0	7	1	40	-	56	17	8.6	2.5	69	20	764	273
Platinum	2	1	3	-	1	0	-	-	14	9	6.7	3.3	17	10	106	96
S. Kuskokwim Bay	23	11	10	3.5	27	3	40	-	208	60	9.1	1.6	258	74	2,610	726
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	43	26.2	5	288	39	5.7	1.4	3,782	910	15.4	1.1	4,734	992	58,331	7,543

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B3.–Estimated harvest of sockeye salmon, for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	22	16.2	5.8	83	22	1,347	937
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	22	16.2	5.8	282	22	1,347	937
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	9	5.9	2.1	4	1	0	-	52	20	18.9	3.8	98	30	1,230	427
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	28.3	12.4	5	2	0	0	70	24	17.2	4.6	90	32	1,630	730
Napaskiak	4	3	35	10.9	14	2	0	0	83	24	26.2	8.6	101	29	2,684	1,626
Oscarville	-	-	-	-	-	-	-	-	19	8	35.6	8.9	19	8	677	331
Bethel	-	-	-	-	-	-	-	-	1,981	446	9.1	1	1,981	446	18,016	3,784
Kwethluk	9	3	43.7	23.1	20	2	0	0	127	28	31.5	5.7	156	33	5,045	1,694
Akiachak	6	0	-	-	13	5	2.4	1.9	129	32	34.7	4.9	148	37	4,700	1,290
Akiak	9	3	63.3	36.6	4	2	25	17.7	62	20	30.2	10.2	75	25	2,539	1,402
Tuluksak	2	1	42	-	11	0	-	-	65	23	29.2	6	78	24	2,305	884
Lower Kuskokwim	108	25	23	5.5	108	14	5	2.9	2,884	625	13.6	0.9	3,100	664	38,826	5,007
Lower Kalskag	-	-	-	-	17	1	0	-	72	16	19.5	5.3	89	17	1,736	920
Upper Kalskag	-	-	-	-	10	4	10	7.7	42	16	20.5	4.2	52	20	961	374
Aniak	-	-	-	-	-	-	-	-	177	97	10.1	1.3	177	97	1,796	444
Chuathbaluk	6	0	-	-	3	2	0	0	29	10	11	3.7	38	12	379	252
Middle Kuskokwim	6	0	-	-	30	7	7.7	6	320	139	13.7	1.5	356	146	4,871	1,117

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	30	16.5	3	3	0.7	0	25	8	18.1	6.5	39	17	785	478
Red Devil	1	0	-	-	7	1	0	-	10	6	35.8	7.3	18	7	379	152
Sleetmute	5	0	-	-	6	3	1.7	1.2	20	10	44.4	10	31	13	1,071	466
Stony River	-	-	-	-	2	1	0	-	17	8	98.8	27.9	19	9	1,679	930
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	0	-	46	6	16.7	15.5	68	18	7.7	4.2	119	25	1,292	1,507
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	1	-	20	14	0.6	0.3	27	15	16	15
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	20.6	11.4	79	15	11.8	10.8	178	64	24.5	3.8	292	86	5,222	1,899
Kuskokwim River Total	323	32	22.6	4.9	226	36	9.6	6.9	3,481	850	14.3	0.8	4,030	918	50,266	5,550
Quinhagak	15	8	13.8	5.4	19	2	5	4.7	138	34	16	2.4	172	44	2,714	756
Goodnews Bay	6	2	10	8.2	7	1	250	-	56	17	23.6	5.7	69	20	3,131	636
Platinum	2	1	5	-	1	0	-	-	14	9	9.8	3.7	17	10	156	108
S. Kuskokwim Bay	23	11	12	4.1	27	3	250	-	208	60	17.6	2.2	258	74	6,001	994
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	43	20.5	4.1	288	39	24.7	6.5	3,782	910	14.5	0.8	4,734	992	56,267	5,638

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B4.–Estimated coho salmon harvest for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	22	6.6	2	83	22	551	318
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	22	6.6	2	282	22	551	318
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	9	3.4	1.4	4	1	0	-	52	20	14.9	4.5	98	30	917	473
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	18.3	7.6	5	2	0	0	70	24	15.8	4.5	90	32	1,383	651
Napaskiak	4	3	30	7.6	14	2	0	0	83	24	6	1.7	101	29	717	326
Oscarville	-	-	-	-	-	-	-	-	19	8	3.3	1.3	19	8	62	50
Bethel	-	-	-	-	-	-	-	-	1,981	446	8.6	1.1	1,981	446	16,998	4,262
Kwethluk	9	3	3.3	2.7	20	2	3	2.8	127	28	48.2	31.3	156	33	7,058	8,950
Akiachak	6	0	-	-	13	5	2	1.6	129	32	30.3	8.3	148	37	4,098	2,196
Akiak	9	3	8.3	6.8	4	2	3.5	2.5	62	20	19.2	8.1	75	25	1,276	994
Tuluksak	2	1	15	-	11	0	-	-	65	23	10	4.3	78	24	788	634
Lower Kuskokwim	108	25	8.3	1.8	108	14	1.5	0.9	2,884	625	12.1	1.8	3,100	664	33,299	10,259
Lower Kalskag	-	-	-	-	17	1	0	-	72	16	1.1	0.6	89	17	95	105
Upper Kalskag	-	-	-	-	10	4	7.5	5.8	42	16	44.4	24.4	52	20	1,939	2,012
Aniak	-	-	-	-	-	-	-	-	177	97	17	1.8	177	97	3,013	628
Chuathbaluk	6	0	-	-	3	2	0	0	29	10	16.1	7.7	38	12	554	522
Middle Kuskokwim	6	0	-	-	30	7	5.8	4.5	320	139	16.9	3.4	356	146	5,600	2,173

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	55.8	24.5	3	3	0.3	0	25	8	50	17.6	39	17	1,865	1,009
Red Devil	1	0	-	-	7	1	0	-	10	6	31.7	6.8	18	7	335	141
Sleetmute	5	0	-	-	6	3	0.3	0.2	20	10	8.7	2.4	31	13	210	114
Stony River	-	-	-	-	2	1	0	-	17	8	30.6	17.7	19	9	521	590
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	0	-	46	6	0	0	68	18	2.6	1.5	119	25	178	197
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	0	-	20	14	2.6	0.8	27	15	63	39
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	38.4	16.8	79	15	0	0	178	64	15.6	3.4	292	86	3,172	1,200
Kuskokwim River Total	323	32	13.3	3.2	226	36	1.1	0.6	3,481	850	12.6	1.6	4,030	918	42,622	10,560
Quinhagak	15	8	6.3	2.1	19	2	11	10.4	138	34	14.1	2.5	172	44	2,296	777
Goodnews Bay	6	2	5	4.1	7	1	140	-	56	17	8.6	3.2	69	20	1,491	352
Platinum	2	1	4	-	1	0	-	-	14	9	7.1	3.1	17	10	114	89
S. Kuskokwim Bay	23	11	5.7	1.7	27	3	140	-	208	60	12.2	1.9	258	74	3,901	858
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	43	11.8	2.6	288	39	9.8	0.6	3,782	910	12.6	1.5	4,734	992	46,523	10,595

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B5.–Estimated pink salmon harvest for communities surveyed, Kuskokwim area, 2008.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	104	0	-	-	2	0	-	-	22	0	-	-	128	0	-	-
Kwigillingok	68	0	-	-	-	-	-	-	3	0	-	-	71	0	-	-
Kongiganak	2	0	-	-	7	0	-	-	74	22	0	0	83	22	0	0
N. Kuskokwim Bay	174	0	-	-	9	0	-	-	99	22	0	0	282	22	0	0
Tuntutuliak	10	0	-	-	5	0	-	-	77	0	-	-	92	0	-	-
Eek	-	-	-	-	13	0	-	-	72	0	-	-	85	0	-	-
Kasigluk	42	9	0	0	4	1	0	-	52	20	0	0	98	30	0	0
Nunapitchuk	4	0	-	-	14	0	-	-	93	0	-	-	111	0	-	-
Atmautluak	7	0	-	-	5	0	-	-	54	0	-	-	66	0	-	-
Napakiak	15	6	0	0	5	2	0	0	70	24	0	0	90	32	0	0
Napaskiak	4	3	0	0	14	2	0	0	83	24	0	0	101	29	0	0
Oscarville	-	-	-	-	-	-	-	-	19	8	0.3	0.2	19	8	5	7
Bethel	-	-	-	-	-	-	-	-	1,981	446	0.1	0	1,981	446	178	111
Kwethluk	9	3	0	0	20	2	0	0	127	28	2	1.3	156	33	291	367
Akiachak	6	0	-	-	13	5	0	0	129	32	0.9	0.4	148	37	118	95
Akiak	9	3	0	0	4	2	0	0	62	20	0.8	0.6	75	25	47	75
Tuluksak	2	1	5	-	11	0	-	-	65	23	0.9	0.5	78	24	77	79
Lower Kuskokwim	108	25	0.1	0	108	14	0	0	2,884	625	0.3	0.1	3,100	664	715	409
Lower Kalskag	-	-	-	-	17	1	0	-	72	16	1.3	1.1	89	17	111	192
Upper Kalskag	-	-	-	-	10	4	0	0	42	16	1.6	1.2	52	20	68	101
Aniak	-	-	-	-	-	-	-	-	177	97	0	0	177	97	2	2
Chuathbaluk	6	0	-	-	3	2	0	0	29	10	0	0	38	12	0	0
Middle Kuskokwim	6	0	-	-	30	7	0	0	320	139	0.5	0.3	356	146	181	217

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	11	6	0	0	3	3	0	0	25	8	0	0	39	17	0	0
Red Devil	1	0	-	-	7	1	0	-	10	6	0.5	0.3	18	7	5	7
Sleetmute	5	0	-	-	6	3	0	0	20	10	0.6	0.2	31	13	14	7
Stony River	-	-	-	-	2	1	0	-	17	8	6.3	4.5	19	9	106	152
Lime Village	2	0	-	-	2	0	-	-	8	0	-	-	12	0	-	-
McGrath	5	1	0	-	46	6	0	0	68	18	0	0	119	25	0	0
Takotna	6	0	-	-	10	0	-	-	9	0	-	-	25	0	-	-
Nikolai	5	0	-	-	2	1	0	-	20	14	0	0	27	15	0	0
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	35	7	0	0	79	15	0	0	178	64	0.8	0.5	292	86	126	152
Kuskokwim River Total	323	32	0.1	0	226	36	0	0	3,481	850	0.3	0.1	4,030	918	1,023	488
Quinhagak	15	8	2.5	1.1	19	2	0	0	138	34	1.5	1	172	44	270	314
Goodnews Bay	6	2	0	0	7	1	0	-	56	17	0.9	0.7	69	20	49	81
Platinum	2	1	0	-	1	0	-	-	14	9	0	0	17	10	0	0
S. Kuskokwim Bay	23	11	1.6	0.7	27	3	0	-	208	60	1.2	0.7	258	74	320	324
Mekoryuk	32	0	-	-	5	0	-	-	26	0	-	-	63	0	-	-
Newtok	78	0	-	-	1	0	-	-	-	-	-	-	79	0	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	50	0	-	-
Toksook Bay	20	0	-	-	28	0	-	-	66	0	-	-	114	0	-	-
Tununak	60	0	-	-	1	0	-	-	-	-	-	-	61	0	-	-
Chefornak	78	0	-	-	-	-	-	-	1	0	-	-	79	0	-	-
Bering Sea Coast	318	0	-	-	35	0	-	-	93	0	-	-	446	0	-	-
Total	664	43	0.4	0.1	288	39	0	0	3,782	910	0.4	0.1	4,734	992	1,342	586

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B6.–Estimated harvest of Chinook salmon, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	18	6.7	7	2	2.5	2.1	79	34	12.6	2.3	92	40	1,118	360
N. Kuskokwim Bay	95	4	18	6.7	7	2	2.5	2.1	209	34	12.6	2.3	311	40	1,118	360
Tuntutuliak	5	3	6.7	4.2	4	2	0	0	73	26	42.6	6.6	82	31	3,141	951
Eek	8	6	9.2	3.3	11	2	0	0	58	25	28	4.1	77	33	1,983	541
Kasigluk	5	2	24	18.6	4	1	0	-	86	40	25.3	3.3	95	43	2,296	583
Nunapitchuk	4	2	2.5	1.8	12	4	5	4.1	98	37	32.5	4.5	114	43	3,256	869
Atmautluak	7	5	11.4	4.9	3	2	2	1.2	57	23	26.8	4.3	67	30	1,615	485
Napakiak	15	9	0	0	5	0	-	-	80	31	27.7	4.7	100	40	2,331	780
Napaskiak	6	6	20.5	0	12	1	0	-	80	35	60.1	5.1	98	42	5,618	916
Oscarville	4	4	21.3	0	-	-	-	-	13	7	51.4	10.5	17	11	754	267
Bethel	-	-	-	-	-	-	-	-	2,005	684	13.1	0.7	2,005	684	26,302	2,933
Kwethluk	4	0	-	-	20	5	12	8.4	133	53	46.6	4.1	157	58	6,601	1,155
Akiachak	8	6	25	7.7	9	1	0	-	124	48	55	6.1	141	55	7,023	1,496
Akiak	10	8	42.8	9.5	2	0	-	-	68	29	40.3	6.8	80	37	3,247	950
Tuluksak	9	5	7	4.7	8	2	11	7.8	69	28	41.8	10.4	86	35	3,032	1,415
Lower Kuskokwim	85	56	15	2	90	20	6.6	3.1	2,944	1,066	21.8	0.7	3,119	1,142	67,199	4,373
Lower Kalskag	3	2	7.5	4.3	12	3	0	0	56	20	43.2	10.6	71	25	2,439	1,158
Upper Kalskag	11	6	23.3	9.5	11	4	7.5	6	44	20	29	4.6	66	30	1,615	465
Aniak	-	-	-	-	-	-	-	-	183	165	11.3	0.6	183	165	2,062	208
Chuathbaluk	3	1	0	-	2	2	1	0	32	22	27.7	5.3	37	25	888	335
Middle Kuskokwim	17	9	16.4	6.2	25	9	3.4	2.6	315	227	21.1	2.1	357	245	7,004	1,309

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	0	0	38	25	15	2.9	41	27	586	219
Red Devil	1	0	-	-	6	2	0	0	7	3	30	2.2	14	5	226	32
Sleetmute	9	8	20.4	4	4	2	0	0	25	19	20.7	4	38	29	702	207
Stony River	5	3	6.7	4.2	2	2	0	0	13	7	51.6	18	20	12	704	461
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	13	1.8	1.2	40	16	1.7	1	74	29	6.2	2.4	149	58	594	361
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	5	3.5	1	1	0	-	27	24	10.3	1.1	32	27	299	64
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	26	5.7	1.2	66	25	1.2	0.7	209	107	14.7	1.8	336	158	3,110	662
Kuskokwim River Total	258	95	12.1	1.3	188	56	3.8	1.4	3,677	1,434	21.2	0.7	4,123	1,585	78,431	4,627
Quinhagak	14	9	5.6	2.7	14	7	0	0	123	57	23.6	2.6	151	73	2,982	634
Goodnews Bay	2	2	2	0	6	3	0	0	58	22	9.7	2.9	66	27	566	324
Platinum	-	-	-	-	2	1	0	-	15	13	4.1	0.9	17	14	61	26
S. Kuskokwim Bay	16	11	5.1	2.3	22	11	0	0	196	92	18	1.8	234	114	3,609	713
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	106	11.5	1.2	243	67	3.3	1.2	4,270	1,526	21	0.6	4,810	1,699	82,040	4,682

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B7.–Estimated harvest of chum salmon, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	7.5	2.8	7	2	7.5	6.3	79	34	15	3.6	92	40	1,285	561
N. Kuskokwim Bay	95	4	7.5	2.8	7	2	7.5	6.3	209	34	15	3.6	311	40	1,285	561
Tuntutuliak	5	3	3.3	2.1	4	2	0	0	73	26	46.5	9.7	82	31	3,411	1,385
Eek	8	6	6.7	2.9	11	2	0	0	58	25	10.4	2.6	77	33	763	347
Kasigluk	5	2	2	1.5	4	1	0	-	86	40	18.7	3.2	95	43	1,618	537
Nunapitchuk	4	2	0	0	12	4	5	4.1	98	37	34.1	5.8	114	43	3,400	1,124
Atmautluak	7	5	6.6	2.6	3	2	2	1.2	57	24	29	7.9	67	31	1,708	889
Napakiak	15	9	8.3	5.3	5	0	-	-	80	31	18.4	5.1	100	40	1,677	857
Napaskiak	6	6	3.8	0	12	1	0	-	80	35	16.5	2.6	98	42	1,532	469
Oscarville	4	4	10.5	0	-	-	-	-	13	7	37.9	7.4	17	11	534	189
Bethel	-	-	-	-	-	-	-	-	2,005	679	5.2	0.4	2,005	679	10,480	1,748
Kwethluk	4	0	-	-	20	5	3.4	2	133	53	24.5	4.5	157	58	3,410	1,215
Akiachak	8	6	9.5	2.7	9	1	0	-	124	48	22.1	5.2	141	55	2,822	1,264
Akiak	10	8	14.6	3.5	2	0	-	-	68	29	17.2	4.1	80	37	1,350	563
Tuluksak	9	5	6.4	4.3	8	2	3.5	1.3	69	28	20.3	4.9	86	35	1,488	663
Lower Kuskokwim	85	56	7.4	1.3	90	20	2.7	1.1	2,944	1,062	11.2	0.6	3,119	1,138	34,193	3,501
Lower Kalskag	3	2	7.5	4.3	12	3	0	0	56	20	15.7	5.6	71	25	899	613
Upper Kalskag	11	6	9.2	3.9	11	4	0	0	44	20	4.7	1.2	66	30	305	133
Aniak	-	-	-	-	-	-	-	-	183	165	14.4	1.6	183	165	2,626	574
Chuathbaluk	3	1	0	-	2	2	1.5	0	32	22	29.5	5.4	37	25	948	340
Middle Kuskokwim	17	9	7.3	2.7	25	9	0.1	0	315	227	14.8	1.5	357	245	4,779	916

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	0	0	38	25	13.4	3	41	27	522	228
Red Devil	1	0	-	-	6	2	0	0	7	3	28.3	14	14	5	214	206
Sleetmute	9	8	3.8	1.3	4	2	0	0	25	19	13.6	4	38	29	375	197
Stony River	5	3	3.3	2.1	2	2	0	0	13	7	58	26	20	12	771	662
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	13	0	0	40	16	0	0	74	29	11.4	8.1	149	58	842	1,168
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	2	1.4	1	1	0	-	27	24	10.9	2.2	32	27	302	115
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	26	1.1	0.3	66	25	0	0	209	107	16	3.9	336	158	3,024	1,396
Kuskokwim River Total	258	95	5.2	0.7	188	56	1.5	0.5	3,677	1,430	11.8	0.6	4,123	1,581	43,281	3,919
Quinhagak	14	9	2.2	0.9	14	7	0	0	123	57	10.3	1.4	151	73	1,300	336
Goodnews Bay	2	2	2.5	0	6	3	0	0	58	22	2.3	0.7	66	27	137	81
Platinum	-	-	-	-	2	1	0	-	15	13	1.8	0.4	17	14	28	13
S. Kuskokwim Bay	16	11	2.3	0.8	22	11	0	0	196	92	7.3	0.9	234	114	1,464	346
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	106	5	0.7	243	67	1.3	0.5	4,270	1,522	11.6	0.5	4,810	1,695	44,745	3,934

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B8.–Estimated harvest of sockeye salmon, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	4	2.3	7	2	2.5	2.1	79	34	9.7	2.2	92	40	808	338
N. Kuskokwim Bay	95	4	4	2.3	7	2	2.5	2.1	209	34	9.7	2.2	311	40	808	338
Tuntutuliak	5	3	3.3	2.1	4	2	0	0	73	26	12.8	2.4	82	31	954	351
Eek	8	6	4	1.6	11	2	0	0	58	25	15.9	4.2	77	33	1,115	561
Kasigluk	5	2	1	0.8	4	1	0	-	86	40	10.7	2.3	95	43	927	389
Nunapitchuk	4	2	0	0	12	4	2.5	2	98	37	14.5	2.4	114	43	1,455	470
Atmautluak	7	5	3.6	1.2	3	2	1	0.6	57	24	10.8	2.9	67	31	641	319
Napakiak	15	9	3.7	2.3	5	0	-	-	80	31	10.2	2.4	100	40	916	406
Napaskiak	6	6	6.7	0	12	1	0	-	80	35	17.7	1.9	98	42	1,655	332
Oscarville	4	4	5	0	-	-	-	-	13	7	24.1	8.9	17	11	334	228
Bethel	-	-	-	-	-	-	-	-	2,005	681	5.7	0.4	2,005	681	11,329	1,533
Kwethluk	4	0	-	-	20	5	1.4	1.2	133	53	16.1	1.7	157	58	2,228	456
Akiachak	8	6	15.8	5	9	1	0	-	124	48	18.3	3	141	55	2,390	723
Akiak	10	8	10.9	2	2	0	-	-	68	29	16.9	3.5	80	37	1,290	480
Tuluksak	9	5	5	3.3	8	2	8.5	5.6	69	28	21.6	5.1	86	35	1,601	701
Lower Kuskokwim	85	56	5.9	0.8	90	20	2.2	0.9	2,944	1,064	8.7	0.4	3,119	1,140	26,836	2,245
Lower Kalskag	3	2	3	1.7	12	3	0	0	56	20	17.9	8.1	71	25	1,009	886
Upper Kalskag	11	6	9.2	5	11	4	2.8	2.2	44	20	5.1	1.1	66	30	355	153
Aniak	-	-	-	-	-	-	-	-	183	165	5.1	0.4	183	165	941	146
Chuathbaluk	3	1	0	-	2	2	0	0	32	22	17.9	2.9	37	25	572	181
Middle Kuskokwim	17	9	6.5	3.2	25	9	1.2	1	315	227	8.7	1.5	357	245	2,876	929

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	0	0	38	25	8.3	1.5	41	27	323	114
Red Devil	1	0	-	-	6	2	0	0	7	3	55.3	16	14	5	417	236
Sleetmute	9	8	36.9	8.5	4	2	0	0	25	19	14.4	2.6	38	29	692	196
Stony River	5	3	3.3	2.1	2	2	0	0	13	7	73.9	28	20	12	977	713
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	13	0	0	40	16	0.3	0.2	74	29	13.2	8.2	149	58	985	1,184
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	0	0	1	1	0	-	27	24	2.5	0.7	32	27	66	37
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	26	6.6	1.5	66	25	0.2	0.1	209	107	16.7	3.9	336	158	3,460	1,421
Kuskokwim River Total	258	95	6.1	0.7	188	56	1.3	0.4	3,677	1,432	9.2	0.4	4,123	1,583	33,980	2,835
Quinhagak	14	9	3.9	1.7	14	7	5.3	3.7	123	57	13.1	1.6	151	73	1,740	406
Goodnews Bay	2	2	105	0	6	3	0	0	58	22	11.6	3.8	66	27	885	427
Platinum	-	-	-	-	2	1	0	-	15	13	12.4	2	17	14	186	58
S. Kuskokwim Bay	16	11	16.5	1.5	22	11	3.4	2.4	196	92	12.6	1.5	234	114	2,811	592
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	106	7.1	0.7	243	67	1.5	0.5	4,270	1,524	9.4	0.4	4,810	1,697	36,791	2,896

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B9.–Estimated harvest of coho salmon, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	17.8	5.9	7	2	12.5	10.6	79	34	5.3	1.1	92	40	610	235
N. Kuskokwim Bay	95	4	17.8	5.9	7	2	12.5	10.6	209	34	5.3	1.1	311	40	610	235
Tuntutuliak	5	3	3.3	2.1	4	2	0	0	73	26	4.8	1.8	82	31	368	253
Eek	8	6	0.3	0.2	11	2	0	0	58	25	2.8	0.9	77	33	193	123
Kasigluk	5	2	0	0	4	1	0	-	86	40	7.2	1.7	95	43	617	286
Nunapitchuk	4	2	0	0	12	4	0	0	98	37	2.9	1.4	114	43	281	274
Atmautluak	7	5	0.8	0.4	3	2	2	1.2	57	24	1	0.6	67	31	66	72
Napakiak	15	9	3.9	1.8	5	0	-	-	80	31	4.4	1	100	40	428	179
Napaskiak	6	6	3.8	0	12	1	0	-	80	35	8.7	1.5	98	42	821	261
Oscarville	4	4	4.3	0	-	-	-	-	13	7	3.9	1.9	17	11	67	50
Bethel	-	-	-	-	-	-	-	-	2,005	683	6.5	0.6	2,005	683	13,037	2,224
Kwethluk	4	0	-	-	20	5	0.8	0.7	133	53	30	13.3	157	58	4,113	3,551
Akiachak	8	6	11.7	3.7	9	1	0	-	124	48	12	2.8	141	55	1,581	674
Akiak	10	8	14	4.1	2	0	-	-	68	29	7.4	2.4	80	37	661	343
Tuluksak	9	5	16	6.9	8	2	0	0	69	28	10.1	3.6	86	35	839	502
Lower Kuskokwim	85	56	6.2	1	90	20	0.4	0.2	2,944	1,066	7.6	0.7	3,119	1,142	23,071	4,328
Lower Kalskag	3	2	0	0	12	3	0	0	56	21	5.5	2.4	71	26	307	265
Upper Kalskag	11	6	2.3	1.6	11	4	12.5	10	44	20	1.4	0.6	66	30	225	224
Aniak	-	-	-	-	-	-	-	-	183	165	12.4	1.1	183	165	2,264	387
Chuathbaluk	3	1	0	-	2	2	0	0	32	22	3	0.9	37	25	97	57
Middle Kuskokwim	17	9	1.5	1	25	9	5.5	4.4	315	228	8.7	0.8	357	246	2,893	522

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	0	0	38	26	7.2	1.6	41	28	282	119
Red Devil	1	0	-	-	6	2	0	0	7	3	14.7	8.3	14	5	111	122
Sleetmute	9	8	7.6	1.5	4	2	0	0	25	19	12.6	2.5	38	29	384	124
Stony River	5	3	2.7	1.7	2	2	0	0	13	7	47.7	21.3	20	12	634	543
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	13	2.8	2.2	40	16	1.2	0.7	74	29	14.9	8.1	149	58	1,244	1,180
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	0	0	1	1	0	-	27	24	7.5	1.5	32	27	204	81
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	26	3.4	1.5	66	25	0.9	0.5	209	108	14.2	3.6	336	159	2,858	1,318
Kuskokwim River Total	258	95	5.2	0.8	188	56	2	0.9	3,677	1,436	8	0.6	4,123	1,587	29,432	4,560
Quinhagak	14	9	0	0	14	7	9.3	5.8	123	57	12.7	2.3	151	73	1,692	573
Goodnews Bay	2	2	3	0	6	3	0	0	58	22	4.4	0.9	66	27	259	107
Platinum	-	-	-	-	2	1	0	-	15	13	5.4	1.2	17	14	81	35
S. Kuskokwim Bay	16	11	0.4	0	22	11	5.9	3.7	196	92	9.7	1.5	234	114	2,032	584
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	106	4.7	0.7	243	67	2.5	0.9	4,270	1,528	8.1	0.6	4,810	1,701	31,464	4,597

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix B10.–Estimated harvest of pink salmon, for communities surveyed, Kuskokwim area, 2009.

	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Kipnuk	89	0	-	-	-	-	-	-	59	0	-	-	148	0	-	-
Kwigillingok	-	-	-	-	-	-	-	-	71	0	-	-	71	0	-	-
Kongiganak	6	4	0	0	7	2	0	0	79	34	0	0	92	40	0	0
N. Kuskokwim Bay	95	4	0	0	7	2	0	0	209	34	0	0	311	40	0	0
Tuntutuliak	5	3	0	0	4	2	0	0	73	26	0.1	0.1	82	31	6	9
Eek	8	6	0	0	11	2	0	0	58	25	0	0	77	33	0	0
Kasigluk	5	2	0	0	4	1	0	-	86	40	0	0	95	43	0	0
Nunapitchuk	4	2	0	0	12	4	0	0	98	37	0.5	0.3	114	43	50	62
Atmautluak	7	5	0	0	3	2	0	0	57	24	0	0	67	31	0	0
Napakiak	15	9	0	0	5	0	-	-	80	31	0	0	100	40	0	0
Napaskiak	6	6	0	0	12	1	0	-	80	35	2.6	1.9	98	42	234	345
Oscarville	4	4	0	0	-	-	-	-	13	7	0	0	17	11	0	0
Bethel	-	-	-	-	-	-	-	-	2,005	683	0	0	2,005	683	70	57
Kwethluk	4	0	-	-	20	5	0	0	133	53	1.1	0.5	157	58	152	129
Akiachak	8	6	0	0	9	1	0	-	124	48	0	0	141	55	0	0
Akiak	10	8	0	0	2	0	-	-	68	29	0	0	80	37	0	0
Tuluksak	9	5	0	0	8	2	0	0	69	28	0.1	0.1	86	35	10	10
Lower Kuskokwim	85	56	0	0	90	20	0	0	2,944	1,066	0.2	0.1	3,119	1,142	523	378
Lower Kalskag	3	2	0	0	12	3	0	0	56	21	0.1	0.1	71	26	5	8
Upper Kalskag	11	6	0	0	11	4	0	0	44	20	0	0	66	30	0	0
Aniak	-	-	-	-	-	-	-	-	183	165	0	0	183	165	2	1
Chuathbaluk	3	1	0	-	2	2	0	0	32	22	0	0	37	25	0	0
Middle Kuskokwim	17	9	0	0	25	9	0	0	315	228	0	0	357	246	8	8

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	Unknown				Does Not Usually Harvest				Usually Harvest				Combined			
Community	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	*N*	*n*	Mean	SE	Total *N*	total *n*	Est. Total	CI (95%)
Crooked Creek	1	0	-	-	2	2	0	0	38	26	0	0	41	28	0	0
Red Devil	1	0	-	-	6	2	0	0	7	3	0	0	14	5	0	0
Sleetmute	9	8	0.5	0.2	4	2	0	0	25	19	0.1	0	38	29	6	3
Stony River	5	3	0	0	2	2	0	0	13	7	0	0	20	12	0	0
Lime Village	2	0	-	-	3	0	-	-	10	0	-	-	15	0	-	-
McGrath	35	13	0	0	40	16	0	0	74	29	0	0	149	58	0	0
Takotna	4	0	-	-	7	0	-	-	14	0	-	-	25	0	-	-
Nikolai	4	2	0	0	1	1	0	-	27	24	0	0	32	27	0	0
Telida	-	-	-	-	1	0	-	-	1	0	-	-	2	0	-	-
Upper Kuskokwim	61	26	0.1	0	66	25	0	0	209	108	0	0	336	159	6	3
Kuskokwim River Total	258	95	0	0	188	56	0	0	3,677	1,436	0.1	0	4,123	1,587	536	378
Quinhagak	14	9	0	0	14	7	0	0	123	57	0.1	0.1	151	73	17	25
Goodnews Bay	2	2	0.5	0	6	3	0	0	58	22	0.1	0.1	66	27	9	12
Platinum	-	-	-	-	2	1	0	-	15	13	0	0	17	14	0	0
S. Kuskokwim Bay	16	11	0.1	0	22	11	0	0	196	92	0.1	0.1	234	114	26	28
Mekoryuk	-	-	-	-	5	0	-	-	57	0	-	-	62	0	-	-
Newtok	-	-	-	-	1	0	-	-	78	0	-	-	79	0	-	-
Nightmute	9	0	-	-	-	-	-	-	46	0	-	-	55	0	-	-
Toksook Bay	8	0	-	-	26	0	-	-	80	0	-	-	114	0	-	-
Tununak	-	-	-	-	1	0	-	-	60	0	-	-	61	0	-	-
Chefornak	6	0	-	-	-	-	-	-	76	0	-	-	82	0	-	-
Bering Sea Coast	23	0	-	-	33	0	-	-	397	0	-	-	453	0	-	-
Total	297	106	0	0	243	67	0	0	4,270	1,528	0.1	0	4,810	1,701	562	379

Note: '*N*' is the total number of households, '*n*' is the number of households surveyed. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

APPENDIX C: ESTIMATES OF NON-SALMON SUBSISTENCE FISH HARVESTED

Appendix C1.–Number of fish reported as received from subsistence, commercial and test fisheries, Kuskokwim area, 2008.

			Received from subsistence fishermen					Received from commercial fishermen					Received from Bethel Test Fishery				
Community	*N*	*n*	Chinook	Chum	Sockeye	Coho	Pink	Chinook	Chum	Sockeye	Coho	Pink	Chinook	Chum	Sockeye	Coho	Pink
Kipnuk	128	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kongiganak	83	21	34	47	38	8	0	0	0	0	0	0	0	0	0	0	0
N. Kuskokwim Bay	282	21	34	47	38	8	0	0	0	0	0	0	0	0	0	0	0
Tuntutuliak	92	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eek	85	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kasigluk	98	30	110	76	55	52	0	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	111	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atmautluak	66	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Napakiak	90	32	61	45	50	39	0	0	0	0	0	0	0	0	0	0	0
Napaskiak	101	29	329	106	174	82	0	0	0	0	0	0	0	0	0	0	0
Oscarville	19	7	0	112	0	1	0	0	0	0	0	0	0	0	0	0	0
Bethel	1,981	405	537	163	278	406	3	0	0	0	0	0	91	37	117	198	0
Kwethluk	156	33	121	10	11	2	0	0	0	0	0	0	0	0	0	0	0
Akiachak	148	36	59	22	22	26	0	0	0	0	0	0	0	0	0	0	0
Akiak	75	23	83	0	10	2	0	0	0	0	0	0	0	0	0	0	0
Tuluksak	78	24	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lower Kuskokwim	3,100	619	1,307	534	600	610	3	0	0	0	0	0	91	37	117	198	0
Lower Kalskag	89	17	21	20	16	15	0	0	0	0	0	0	0	0	0	0	0
Upper Kalskag	52	20	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aniak	177	89	76	53	41	58	0	0	0	0	0	0	0	0	0	0	0
Chuathbaluk	38	12	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0
Middle Kuskokwim	356	138	117	78	62	78	0	0	0	0	0	0	0	0	0	0	0

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			Received from subsistence fishermen					Received from commercial fishermen					Received from Bethel Test Fishery				
Community	*N*	*n*	Chinook	Chum	Sockeye	Coho	Pink	Chinook	Chum	Sockeye	Coho	Pink	Chinook	Chum	Sockeye	Coho	Pink
Crooked Creek	39	17	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Devil	18	6	2	0	3	4	0	0	0	0	0	0	0	0	0	0	0
Sleetmute	31	12	5	5	10	0	0	0	0	0	0	0	0	0	0	0	0
Stony River	19	8	103	103	55	0	0	0	0	0	0	0	0	0	0	0	0
Lime Village	12	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
McGrath	119	26	60	0	44	9	0	0	0	0	0	0	0	0	0	0	0
Takotna	25	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nikolai	27	14	8	30	0	2	0	0	0	0	0	0	0	0	0	0	0
Telida	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Kuskokwim	292	83	204	138	112	15	0	0	0	0	0	0	0	0	0	0	0
Kuskokwim River total	4,030	861	1,662	797	812	711	3	0	0	0	0	0	91	37	117	198	0
Quinhagak	172	42	100	24	56	46	3	1	73	1	1	1	0	0	0	0	0
Goodnews Bay	69	20	42	30	30	30	10	0	0	0	0	0	0	0	0	0	0
Platinum	17	9	8	5	5	5	0	0	0	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	258	71	150	59	91	81	13	1	73	1	1	1	0	0	0	0	0
Mekoryuk	63	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newtok	79	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tununak	61	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chefornak	79	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bering Sea Coast	446	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4,736	932	1,812	856	903	792	16	1	73	1	1	1	91	37	117	198	0

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about receiving fish. Kuskokwim River Total includes Lower, Middle and Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix C2.–Number of fish reported as received from subsistence, commercial and test fisheries, Kuskokwim area, 2009.

			Received from subsistence fishermen					Received from commercial fishermen					Received from Bethel Test Fishery				
Community	*N*	*n*	Chinook	Chum	Coho	Sockeye	Pink	Chinook	Chum	Coho	Sockeye	Pink	Chinook	Chum	Coho	Sockeye	Pink
Kipnuk	148	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kongiganak	92	34	28	37	38	18	0	0	0	0	0	0	0	0	0	0	0
N. Kuskokwim Bay	311	34	28	37	38	18	0	0	0	0	0	0	0	0	0	0	0
Tuntutuliak	82	27	6	4	4	6	0	0	0	0	0	0	0	0	0	0	0
Eek	77	33	111	68	108	32	0	0	0	0	0	0	0	0	0	0	0
Kasigluk	95	42	224	246	31	15	0	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	114	39	20	20	11	6	0	0	0	0	0	0	0	0	0	0	0
Atmautluak	67	31	22	23	23	5	0	0	0	0	0	0	0	0	0	0	0
Napakiak	100	40	53	50	90	35	0	0	0	0	0	0	0	0	0	0	0
Napaskiak	98	40	79	20	61	0	0	0	0	0	0	0	0	0	0	0	0
Oscarville	17	10	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bethel	2,005	675	1,009	330	246	629	0	3	0	0	0	0	212	110	128	609	0
Kwethluk	157	55	58	18	12	44	0	0	0	0	0	0	3	0	0	0	0
Akiachak	141	55	80	16	21	15	0	0	0	0	0	0	0	0	0	0	0
Akiak	80	36	52	23	14	12	2	0	0	0	0	0	0	0	0	0	0
Tuluksak	86	32	46	15	11	10	0	0	0	0	0	0	0	0	0	0	0
Lower Kuskokwim River	3,119	1,115	1,776	833	632	809	2	3	0	0	0	0	215	110	128	609	0
Lower Kalskag	71	23	47	98	75	60	0	0	0	0	0	0	0	0	0	0	0
Upper Kalskag	66	29	29	5	21	16	0	0	0	0	0	0	0	0	0	0	0
Aniak	183	162	140	34	56	165	0	0	0	0	0	0	0	0	0	0	0
Chuathbaluk	37	25	46	19	4	4	0	0	0	0	0	0	0	0	0	0	0
Middle Kuskokwim	357	239	262	156	156	245	0	0	0	0	0	0	0	0	0	0	0

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			Received from subsistence fishermen					Received from commercial fishermen					Received from Bethel Test Fishery				
Community	*N*	*n*	Chinook	Chum	Coho	Sockeye	Pink	Chinook	Chum	Coho	Sockeye	Pink	Chinook	Chum	Coho	Sockeye	Pink
Crooked Creek	41	28	33	20	22	11	0	0	0	0	0	0	0	0	0	0	0
Red Devil	14	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0
Sleetmute	38	28	19	10	168	6	0	0	0	0	0	0	0	0	0	0	0
Stony River	20	12	11	10	15	12	0	0	0	0	0	0	0	0	0	0	0
Lime Village	15	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
McGrath	149	52	68	2	68	26	0	0	0	0	0	0	0	0	0	0	0
Takotna	25	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nikolai	32	27	9	14	1	0	0	0	0	0	0	0	0	0	0	0	0
Telida	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Kuskokwim	336	152	145	61	279	55	0	0	0	0	0	0	0	0	0	0	0
Kuskokwim River Total	4,123	1,540	2,211	1,087	1,105	1,127	2	3	0	0	0	0	215	110	128	609	0
Quinhagak	151	70	56	14	54	39	4	0	10	6	4	0	0	0	0	0	0
Goodnews Bay	66	25	12	3	57	5	0	0	0	0	0	0	0	0	0	0	0
Platinum	17	14	6	2	10	13	0	0	0	0	0	0	5	0	0	0	0
S. Kuskokwim Bay	234	109	74	19	121	57	4	0	10	6	4	0	5	0	0	0	0
Mekoryuk	62	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Newtok	79	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nightmute	55	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tununak	61	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chefornak	82	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bering Sea Coast	453	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4,810	1,649	2,285	1,106	1,226	1,184	6	3	10	6	4	0	220	110	128	609	0

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about receiving fish. Kuskokwim River Total includes Lower, Middle and Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix C3.–Fishing gear indicated as the primary type used by subsistence fishermen, Kuskokwim area, 2008.

Community	*N*	*n*	Set Net	Drift Net	Fish wheel	Hook & Line
Kipnuk	128	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	83	18	-	18	-	-
N. Kuskokwim Bay	282	18	-	18	-	-
Tuntutuliak	92	-	-	-	-	-
Eek	85	-	-	-	-	-
Kasigluk	98	20	-	20	-	-
Nunapitchuk	111	-	-	-	-	-
Atmautluak	66	-	-	-	-	-
Napakiak	90	19	5	14	-	-
Napaskiak	101	18	1	17	-	-
Oscarville	19	8	3	5	-	-
Bethel	1,981	190	16	161	-	13
Kwethluk	156	25	4	19	-	2
Akiachak	148	29	1	28	-	-
Akiak	75	20	2	18	-	-
Tuluksak	78	23	2	18	-	3
Lower Kuskokwim	3,100	352	34	300	-	18
Lower Kalskag	89	10	2	8	-	-
Upper Kalskag	52	14	1	13	-	-
Aniak	177	72	3	44	-	25
Chuathbaluk	38	7	1	5	-	1
Middle Kuskokwim	356	103	7	70	-	26
Crooked Creek	39	10	-	7	-	3
Red Devil	18	6	3	2	-	1
Sleetmute	31	9	-	7	-	2
Stony River	19	5	3	-	2	-
Lime Village	12	-	-	-	-	-
McGrath	119	10	3	4	-	3
Takotna	25	-	-	-	-	-
Nikolai	27	11	6	-	-	5
Telida	2	-	-	-	-	-
Upper Kuskokwim	292	51	15	20	2	14
Kuskokwim River total	4,030	524	56	408	2	58
Quinhagak	172	30	2	22	-	6
Goodnews Bay	69	15	4	8	-	3
Platinum	17	6	1	1	-	4
S. Kuskokwim Bay	258	51	7	31	-	13
Mekoryuk	63	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	50	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	79	-	-	-	-	-
Bering Sea Coast	446	-	-	-	-	-
Total	4,736	575	63	439	2	71

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about which type is their PRIMARY gear. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix C4.–Fishing gear indicated as the primary type used by subsistence fishermen, Kuskokwim area, 2009.

Community	*N*	*n*	Set Net	Drift Net	Fish wheel	Hook & Line
Kipnuk	148	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	92	23	-	22	1	-
N. Kuskokwim Bay	311	23	-	22	1	-
Tuntutuliak	82	24	-	23	-	1
Eek	77	22	7	15	-	-
Kasigluk	95	28	-	28	-	-
Nunapitchuk	114	25	1	24	-	-
Atmautluak	67	17	-	17	-	-
Napakiak	100	25	5	19	-	1
Napaskiak	98	31	9	22	-	-
Oscarville	17	7	2	5	-	-
Bethel	2,005	320	22	278	1	19
Kwethluk	157	46	15	29	-	2
Akiachak	141	45	9	36	-	-
Akiak	80	26	5	21	-	-
Tuluksak	86	22	8	13	-	1
Lower Kuskokwim	3,119	638	83	530	1	24
Lower Kalskag	71	16	-	16	-	-
Upper Kalskag	66	19	-	18	-	1
Aniak	183	110	13	45	-	52
Chuathbaluk	37	16	1	14	-	1
Middle Kuskokwim	357	161	14	93	-	54
Crooked Creek	41	13	-	13	-	-
Red Devil	14	3	1	2	-	-
Sleetmute	38	19	6	9	1	3
Stony River	20	7	5	1	-	1
Lime Village	15	-	-	-	-	-
McGrath	149	18	10	1	1	6
Takotna	25	-	-	-	-	-
Nikolai	32	17	13	-	-	4
Telida	2	-	-	-	-	-
Upper Kuskokwim	336	77	35	26	2	14
Kuskokwim River total	4,123	899	132	671	4	92
Quinhagak	151	47	1	37	1	8
Goodnews Bay	66	17	4	11	-	2
Platinum	17	9	3	4	-	2
S. Kuskokwim Bay	234	73	8	52	1	12
Mekoryuk	62	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	55	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	82	-	-	-	-	-
Bering Sea Coast	453	-	-	-	-	-
Total	4,812	972	140	723	5	104

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about which type is their PRIMARY gear. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix C5.–Number of non-salmon species reported as harvested (unexpanded) including those caught in the previous winter, Kuskokwim area, 2008.

Community	*N*	*n*	Lg. Whitefish	Sm. Whitefish	Sheefish	Burbot	Pike	Blackfish	Grayling	Char	Herring	Smelt	Rainbow
Kipnuk	128	0	-	-	-	-	-	-	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-	-	-	-	-	-	-
Kongiganak	83	23	10	150	2	0	320	450	0	0	4,100	170	0
N. Kuskokwim Bay	282	23	10	150	2	0	320	450	0	0	4,100	170	0
Tuntutuliak	92	0	-	-	-	-	-	-	-	-	-	-	-
Eek	85	0	-	-	-	-	-	-	-	-	-	-	-
Kasigluk	98	30	62	1,413	60	280	1,055	900	0	0	0	550	5
Nunapitchuk	111	0	-	-	-	-	-	-	-	-	-	-	-
Atmautluak	66	0	-	-	-	-	-	-	-	-	-	-	-
Napakiak	90	32	121	272	11	3	4	0	0	0	0	250	13
Napaskiak	101	30	51	206	29	0	220	0	0	0	0	100	0
Oscarville	19	8	0	420	100	0	105	0	0	0	0	1,000	0
Bethel	1,981	429	531	620	60	612	1,842	7,095	304	40	0	7,104	31
Kwethluk	156	32	0	522	34	140	243	100	0	0	0	900	16
Akiachak	148	37	10	1,014	337	690	1,630	300	13	18	0	600	1
Akiak	75	23	240	265	50	240	205	0	16	0	0	3,670	0
Tuluksak	78	23	214	243	144	0	56	0	25	0	0	500	1
Lower Kuskokwim	3,100	644	1,229	4,975	825	1,965	5,360	8,395	358	58	0	14,674	67
Lower Kalskag	89	17	0	490	16	34	71	600	0	0	0	2,050	0
Upper Kalskag	52	19	47	431	171	4	0	0	0	0	0	100	0
Aniak	177	93	226	331	183	0	94	20	104	91	0	512	85
Chuathbaluk	38	12	0	215	80	65	9	0	100	0	0	200	2
Middle Kuskokwim	356	141	273	1,467	450	103	174	620	204	91	0	2,862	87

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Community	*N*	*n*	Lg. Whitefish	Sm. Whitefish	Sheefish	Burbot	Pike	Blackfish	Grayling	Char	Herring	Smelt	Rainbow
Crooked Creek	39	17	0	10	161	2	12	0	10	5	0	0	2
Red Devil	18	7	16	120	51	0	55	0	31	0	0	0	0
Sleetmute	31	13	0	130	101	20	22	0	111	0	0	0	0
Stony River	19	9	279	254	8	0	4	0	19	3	0	0	0
Lime Village	12	0	-	-	-	-	-	-	-	-	-	-	-
McGrath	119	26	61	37	143	0	49	0	194	0	0	0	0
Takotna	25	0	-	-	-	-	-	-	-	-	-	-	-
Nikolai	27	14	1	16	9	0	12	0	12	0	0	0	9
Telida	2	0	-	-	-	-	-	-	-	-	-	-	-
Upper Kuskokwim	292	86	357	567	473	22	154	0	377	8	0	0	11
Kuskokwim River Total	4,030	894	1,869	7,159	1,750	2,090	6,008	9,465	939	157	4,100	17,706	165
Quinhagak	172	44	20	83	1	16	80	300	15	90	310	1,780	387
Goodnews Bay	69	20	0	31	2	50	50	140	25	40	500	600	343
Platinum	17	10	0	0	0	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	258	74	20	114	3	66	130	440	40	130	810	2,380	730
Mekoryuk	63	0	-	-	-	-	-	-	-	-	-	-	-
Newtok	79	0	-	-	-	-	-	-	-	-	-	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-	-	-	-	-	-	-
Tununak	61	0	-	-	-	-	-	-	-	-	-	-	-
Chefornak	79	0	-	-	-	-	-	-	-	-	-	-	-
Bering Sea Coast	446	0	-	-	-	-	-	-	-	-	-	-	-
Total	4,736	968	1,889	7,273	1,753	2,156	6,138	9,905	979	287	4,910	20,086	895

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species'. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Lg. Whitefish are those larger than 4 lbs, small whitefish are those smaller than 4 lbs.

Appendix C6.–Number of non-salmon species reported as harvested (unexpanded) including those caught in the previous winter, Kuskokwim area, 2009.

Community	*N*	*n*	humpback w.f.	broad w.f.	Cisco	Sheefish	Burbot	pike	Blackfish	Grayling	Char	Herring	Smelt	Rainbow
Kipnuk	148	0	-	-	-	-	-	-	-	-	-	-	-	
Kwigillingok	71	0	-	-	-	-	-	-	-	-	-	-	-	
Kongiganak	92	36	205	43	150	5	0	560	1,463	0	0	11,895	847	5
N. Kuskokwim Bay	311	36	205	43	150	5	0	560	1,463	0	0	11,895	847	5
Tuntutuliak	82	30	1,785	245	95	39	409	1,645	2,191	0	2	0	0	0
Eek	77	34	121	99	295	60	514	1,051	8,075	84	60	55	1	12
Kasigluk	95	43	1,290	1,568	0	21	90	3,120	382	0	0	0	900	0
Nunapitchuk	114	42	1,188	1,312	0	85	129	3,311	8,500	8	0	0	1,475	4
Atmautluak	67	30	230	844	0	0	35	1,781	4,250	0	0	0	135	0
Napakiak	100	37	1,099	306	4	138	157	2,820	11,550	0	0	20	3,255	0
Napaskiak	98	43	664	226	6	114	216	1,942	265	0	0	0	4,450	21
Oscarville	17	9	490	509	0	27	193	220	1,050	0	0	0	1,075	0
Bethel	2,005	692	1,038	338	92	209	526	6,601	568	103	175	70	28,979	123
Kwethluk	157	56	1,226	470	63	71	374	2,342	603	22	29	0	8,110	63
Akiachak	141	56	2,613	600	0	182	790	2,894	14,775	18	5	0	18,800	37
Akiak	80	36	2,173	165	185	868	9,985	3,018	4,790	254	12	0	24,825	145
Tuluksak	86	35	739	204	0	203	193	976	1,375	47	5	0	6,825	9
Lower Kuskokwim	3,119	1,143	14,656	6,886	740	2,017	13,611	31,721	58,374	536	288	145	98,830	414
Lower Kalskag	71	26	421	110	0	115	32	405	800	24	3	0	2,050	0
Upper Kalskag	66	28	254	267	0	2	5	67	1,000	0	0	0	1,675	1
Aniak	183	166	521	393	211	176	10	135	33	99	116	0	0	57
Chuathbaluk	37	25	11	70	0	92	128	62	100	36	0	0	100	0
Middle Kuskokwim	357	245	1,207	840	211	385	175	669	1,933	159	119	0	3,825	58

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Community	*N*	*n*	humpback w.f.	broad w.f.	Cisco	Sheefish	Burbot	pike	Blackfish	Grayling	Char	Herring	Smelt	Rainbow
Crooked Creek	41	27	20	90	0	100	0	9	0	55	15	0	0	0
Red Devil	14	5	10	18	0	22	50	50	100	0	0	0	0	0
Sleetmute	38	28	55	110	2	259	2	66	0	337	2	0	0	0
Stony River	20	11	60	135	0	163	0	130	0	32	0	0	0	0
Lime Village	15	0	-	-	-	-	-	-	-	-	-	-	-	
McGrath	149	53	466	50	20	158	0	115	0	171	2	0	0	0
Takotna	25	0	-	-	-	-	-	-	-	-	-	-	-	
Nikolai	32	27	37	42	0	40	0	84	0	63	0	0	0	0
Telida	2	0	-	-	-	-	-	-	-	-	-	-	-	
Upper Kuskokwim	336	151	648	445	22	742	52	454	100	658	19	0	0	0
Kuskokwim River Total	4,123	1,575	16,716	8,214	1,123	3,149	13,838	33,404	61,870	1,353	426	12,040	103,502	477
Quinhagak	151	71	162	232	85	1	6	218	1,925	57	571	450	1,977	901
Goodnews Bay	66	28	487	15	100	0	0	50	0	19	2,060	270	438	16
Platinum	17	14	0	0	0	0	0	52	0	10	233	1,200	35	4
S. Kuskokwim Bay	234	113	649	247	185	1	6	320	1,925	86	2,864	1,920	2,450	921
Mekoryuk	62	0	-	-	-	-	-	-	-	-	-	-	-	
Newtok	79	0	-	-	-	-	-	-	-	-	-	-	-	
Nightmute	55	0	-	-	-	-	-	-	-	-	-	-	-	
Toksook Bay	114	0	-	-	-	-	-	-	-	-	-	-	-	
Tununak	61	0	-	-	-	-	-	-	-	-	-	-	-	
Chefornak	82	0	-	-	-	-	-	-	-	-	-	-	-	
Bering Sea Coast	453	0	-	-	-	-	-	-	-	-	-	-	-	
Total	4,812	1,688	17,365	8,461	1,308	3,150	13,844	33,724	63,795	1,439	3,290	13,960	105,952	1,398

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. W.F. is Whitefish.

Appendix C7.–Estimated (expanded) harvest of large whitefish, including those caught in previous winter, Kuskokwim area, 2008.

Community	*N*	*n*	Total	CI (95%)
Kipnuk	128	0	-	-
Kwigillingok	71	0	-	-
Kongiganak	83	23	36	41
N. Kuskokwim Bay	282	23	36	41
Tuntutuliak	92	0	-	-
Eek	85	0	-	-
Kasigluk	98	30	161	203
Nunapitchuk	111	0	-	-
Atmautluak	66	0	-	-
Napakiak	90	32	345	269
Napaskiak	101	30	104	67
Oscarville	19	7	0	0
Bethel	1,981	410	2,566	2,176
Kwethluk	156	33	0	0
Akiachak	148	35	45	77
Akiak	75	23	819	1,131
Tuluksak	78	23	714	490
Lower Kuskokwim	3,100	623	4,754	2,526
Lower Kalskag	89	17	0	0
Upper Kalskag	52	20	123	126
Aniak	177	93	430	216
Chuathbaluk	38	12	0	0
Middle Kuskokwim	356	142	554	250
Crooked Creek	39	17	0	0
Red Devil	18	7	28	32
Sleetmute	31	13	0	0
Stony River	19	9	593	614
Lime Village	12	0	-	-
McGrath	119	26	218	244
Takotna	25	0	-	-
Nikolai	27	15	2	2
Telida	2	0	-	-
Upper Kuskokwim	292	87	841	661
Kuskokwim River Total	4,030	875	6,185	2,623
Quinhagak	172	43	91	155
Goodnews Bay	69	20	0	0
Platinum	17	7	0	0
S. Kuskokwim Bay	258	70	91	155
Mekoryuk	63	0	-	-
Newtok	79	0	-	-
Nightmute	50	0	-	-
Toksook Bay	114	0	-	-
Tununak	61	0	-	-
Chefornak	79	0	-	-
Bering Sea Coast	446	0	-	-
Total	4,734	945	6,276	2,628

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Lg. Whitefish are >/= 4 lbs, small whitefish are <4 lbs.

Appendix C8.–Estimated (expanded) harvest of small whitefish, including those caught in previous winter, Kuskokwim area, 2008.

Community	*N*	*n*	Total	CI (95%)
Kipnuk	128	0	-	-
Kwigillingok	71	0	-	-
Kongiganak	83	23	541	485
N. Kuskokwim Bay	282	23	541	485
Tuntutuliak	92	0	-	-
Eek	85	0	-	-
Kasigluk	98	30	4,097	1,741
Nunapitchuk	111	0	-	-
Atmautluak	66	0	-	-
Napakiak	90	32	773	401
Napaskiak	101	30	771	704
Oscarville	19	7	1,140	1,073
Bethel	1,981	406	3,025	2,439
Kwethluk	156	33	2,668	1,901
Akiachak	148	35	4,367	1,720
Akiak	75	23	913	770
Tuluksak	78	23	814	531
Lower Kuskokwim	3,100	619	18,568	4,270
Lower Kalskag	89	17	2,726	1,476
Upper Kalskag	52	20	1,131	752
Aniak	177	93	630	444
Chuathbaluk	38	12	740	518
Middle Kuskokwim	356	142	5,227	1,792
Crooked Creek	39	17	18	24
Red Devil	18	7	212	263
Sleetmute	31	13	310	197
Stony River	19	9	540	756
Lime Village	12	0	-	-
McGrath	119	26	132	162
Takotna	25	0	-	-
Nikolai	27	15	28	30
Telida	2	0	-	-
Upper Kuskokwim	292	87	1,240	841
Kuskokwim River Total	4,030	871	25,577	4,732
Quinhagak	172	43	379	426
Goodnews Bay	69	20	102	161
Platinum	17	7	0	0
S. Kuskokwim Bay	258	70	481	456
Mekoryuk	63	0	-	-
Newtok	79	0	-	-
Nightmute	50	0	-	-
Toksook Bay	114	0	-	-
Tununak	61	0	-	-
Chefornak	79	0	-	-
Bering Sea Coast	446	0	-	-
Total	4,734	941	26,057	4,754

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Lg. Whitefish are >/= 4 lbs, small whitefish are <4 lbs.

Appendix C9.–Estimated (expanded) harvest of humpback whitefish, including those caught in previous winter, Kuskokwim area, 2009.

Community	*N*	*n*	Total	CI (95%)
Kipnuk	148	0	-	-
Kwigillingok	71	0	-	-
Kongiganak	92	36	500	227
N. Kuskokwim Bay	311	36	500	227
Tuntutuliak	82	29	5,012	3,126
Eek	77	34	266	191
Kasigluk	95	42	2,845	1,071
Nunapitchuk	114	42	3,303	2,230
Atmautluak	67	29	536	356
Napakiak	100	36	3,190	2,127
Napaskiak	98	42	1,510	829
Oscarville	17	9	1,258	1,773
Bethel	2,005	690	3,016	1,510
Kwethluk	157	56	3,218	2,093
Akiachak	141	56	6,427	3,005
Akiak	80	36	5,002	3,046
Tuluksak	86	34	1,846	1,056
Lower Kuskokwim	3,119	1,135	37,428	7,106
Lower Kalskag	71	26	1,118	898
Upper Kalskag	66	28	611	380
Aniak	183	166	574	201
Chuathbaluk	37	24	17	13
Middle Kuskokwim	357	244	2,320	995
Crooked Creek	41	27	31	28
Red Devil	14	5	25	37
Sleetmute	38	28	71	46
Stony River	20	11	110	136
Lime Village	15	0	-	-
McGrath	149	53	1,296	1,126
Takotna	25	0	-	-
Nikolai	32	26	43	27
Telida	2	0	-	-
Upper Kuskokwim	336	150	1,576	1,137
Kuskokwim River Total	4,123	1,565	41,824	7,268
Quinhagak	151	70	362	246
Goodnews Bay	66	27	1,284	1,267
Platinum	17	14	0	0
S. Kuskokwim Bay	234	111	1,646	1,290
Mekoryuk	62	0	-	-
Newtok	79	0	-	-
Nightmute	55	0	-	-
Toksook Bay	114	0	-	-
Tununak	61	0	-	-
Chefornak	82	0	-	-
Bering Sea Coast	453	0	-	-
Total	4,810	1,676	43,470	7,382

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Lg. Whitefish are >/= 4 lbs, small whitefish are <4 lbs.

Appendix C10.–Estimated (expanded) harvest of broad whitefish, including those caught in previous winter, Kuskokwim area, 2009.

Community	*N*	*n*	Total	CI (95%)
Kipnuk	148	0	-	-
Kwigillingok	71	0	-	-
Kongiganak	92	36	113	162
N. Kuskokwim Bay	311	36	113	162
Tuntutuliak	82	29	688	376
Eek	77	34	240	245
Kasigluk	95	42	3,458	1,093
Nunapitchuk	114	42	3,683	2,331
Atmautluak	67	29	1,802	797
Napakiak	100	35	920	440
Napaskiak	98	42	515	247
Oscarville	17	9	1,245	1,789
Bethel	2,005	690	982	341
Kwethluk	157	56	1,234	537
Akiachak	141	56	1,357	615
Akiak	80	36	357	264
Tuluksak	86	34	508	308
Lower Kuskokwim	3,119	1,134	16,988	3,445
Lower Kalskag	71	25	293	223
Upper Kalskag	66	28	689	588
Aniak	183	166	433	75
Chuathbaluk	37	24	107	106
Middle Kuskokwim	357	243	1,522	642
Crooked Creek	41	27	140	78
Red Devil	14	5	45	39
Sleetmute	38	28	136	47
Stony River	20	11	250	307
Lime Village	15	0	-	-
McGrath	149	53	142	159
Takotna	25	0	-	-
Nikolai	32	26	49	26
Telida	2	0	-	-
Upper Kuskokwim	336	150	763	361
Kuskokwim River Total	4,123	1,563	19,387	3,527
Quinhagak	151	71	510	290
Goodnews Bay	66	27	40	45
Platinum	17	14	0	0
S. Kuskokwim Bay	234	112	549	294
Mekoryuk	62	0	-	-
Newtok	79	0	-	-
Nightmute	55	0	-	-
Toksook Bay	114	0	-	-
Tununak	61	0	-	-
Chefornak	82	0	-	-
Bering Sea Coast	453	0	-	-
Total	4,810	1,675	19,936	3,539

Note: '*N*' is the total number of households, '*n*' is the number of households responding that they fish for non-salmon species. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Lg. Whitefish are >/= 4 lbs, small whitefish are <4 lbs.

APPENDIX D: SALMON HARVESTED AND FED TO DOGS

Appendix D1.–Number of people that own dogs, number reporting feeding salmon to dogs, and number of salmon fed to dogs (by species), Kuskokwim area, 2008.

						Fish from subsistence fishery fed to dogs					Fish from commercial fishery fed to dogs				
Community	*N*	*n*	own dog	feed salmon	numdogs	Chinook	Chum	Coho	Sockeye	pink	Chinook	Chum	Coho	Sockeye	Pink
Kipnuk	128	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Kongiganak	83	23	13	0	29	0	0	0	0	0	0	0	0	0	0
N. Kuskokwim Bay	282	23	13	0	29	0	0	0	0	0	0	0	0	0	0
Tuntutuliak	92	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Eek	85	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Kasigluk	98	30	22	0	46	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	111	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Atmautluak	66	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Napakiak	90	33	21	0	36	0	0	0	0	0	0	0	0	0	0
Napaskiak	101	30	12	3	76	10	110	400	10	0	0	0	0	0	0
Oscarville	19	8	7	2	33	0	246	0	0	0	0	0	0	0	0
Bethel	1,981	384	127	4	251	0	50	350	0	0	0	0	0	0	0
Kwethluk	156	33	22	1	93	0	0	1,000	0	0	0	0	0	0	0
Akiachak	148	36	26	3	152	0	0	0	0	0	0	515	0	0	0
Akiak	75	21	11	2	76	0	200	0	50	0	0	0	0	0	0
Tuluksak	78	21	19	1	77	0	0	10	0	0	0	0	0	0	0
Lower Kuskokwim	3,100	596	267	16	840	10	606	1,760	60	0	0	515	0	0	0
Lower Kalskag	89	17	14	0	35	0	0	0	0	0	0	0	0	0	0
Upper Kalskag	52	20	13	3	46	0	280	0	0	0	0	150	0	0	0
Aniak	177	85	56	11	176	0	1,242	95	100	0	0	0	0	0	0
Chuathbaluk	38	12	6	0	14	0	0	0	0	0	0	0	0	0	0
Middle Kuskokwim	356	134	89	14	271	0	1,522	95	100	0	0	150	0	0	0

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						Fish from subsistence fishery fed to dogs					Fish from commercial fishery fed to dogs				
Community	*N*	*n*	own dog	feed salmon	numdogs	Chinook	Chum	Coho	Sockeye	pink	Chinook	Chum	Coho	Sockeye	Pink
Crooked Creek	39	17	11	1	18	0	3	0	0	0	0	0	0	0	0
Red Devil	18	7	5	2	8	0	15	15	0	0	0	0	0	0	0
Sleetmute	31	10	8	0	11	0	0	0	0	0	0	0	0	0	0
Stony River	19	9	8	3	27	0	50	0	0	0	0	0	0	0	0
Lime Village	12	0	-	-	-	-	-	-	-	-	-	-	-	-	-
McGrath	119	26	19	2	35	0	0	15	0	0	0	0	0	0	0
Takotna	25	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nikolai	27	15	12	1	39	0	30	0	0	0	0	0	0	0	0
Telida	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Kuskokwim	292	84	63	9	138	0	98	30	0	0	0	0	0	0	0
Kuskokwim River total	4,030	837	432	39	1,278	10	2,226	1,885	160	0	0	665	0	0	0
Quinhagak	172	42	24	1	44	0	0	10	0	0	0	0	0	0	0
Goodnews Bay	69	20	8	1	32	0	200	0	0	0	0	0	0	0	0
Platinum	17	10	4	0	5	0	0	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	258	72	36	2	81	0	200	10	0	0	0	0	0	0	0
Mekoryuk	63	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Newtok	79	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Nightmute	50	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Tununak	61	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Chefornak	79	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Bering Sea Coast	446	0	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	4,736	909	468	41	1,359	10	2,426	1,895	160	0	0	665	0	0	0

Note: '*N*' is the total number of households, '*n*' is the number of households answering the question about dogs. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. 'numdogs' is the reported number of dogs.

Appendix D2.–Number of people that own dogs, number reporting feeding salmon to dogs, and number of salmon fed to dogs (by species), Kuskokwim area, 2009.

						Fish from subsistence fishery fed to dogs				
Community	*N*	*n*	own dog	feed salmon	numdogs	Chinook	Chum	Coho	Sockeye	pink
Kipnuk	148	0	-	-	-	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-	-	-	-
Kongiganak	92	32	21	0	30	0	0	0	0	0
N. Kuskokwim Bay	311	32	21	0	30	0	0	0	0	0
Tuntutuliak	82	29	22	0	58	0	0	0	0	0
Eek	77	34	25	0	55	0	0	0	0	0
Kasigluk	95	42	31	1	81	0	5	0	5	0
Nunapitchuk	114	39	28	1	58	0	0	0	0	0
Atmautluak	67	30	24	1	62	0	40	0	0	0
Napakiak	100	39	27	0	53	0	0	0	0	0
Napaskiak	98	42	23	2	71	0	75	0	0	0
Oscarville	17	10	4	0	9	0	0	0	0	0
Bethel	2,005	686	314	5	527	1	185	200	0	0
Kwethluk	157	56	40	5	162	0	270	1,060	15	33
Akiachak	141	56	31	4	178	83	75	110	25	0
Akiak	80	34	24	3	154	3	270	0	103	0
Tuluksak	86	33	21	2	59	30	10	0	0	0
Lower Kuskokwim	3,119	1,130	614	24	1,527	117	930	1,370	148	33
Lower Kalskag	71	25	18	3	63	15	105	0	0	0
Upper Kalskag	66	28	16	2	36	0	42	0	0	0
Aniak	183	165	84	15	264	5	1,482	632	50	0
Chuathbaluk	37	24	18	2	28	0	65	0	0	0
Middle Kuskokwim	357	242	136	22	391	20	1,694	632	50	0

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Community	*N*	*n*	own dog	feed salmon	numdogs	Fish from subsistence fishery fed to dogs				
						Chinook	Chum	Coho	Sockeye	pink
Crooked Creek	41	26	15	2	41	0	70	0	0	0
Red Devil	14	5	1	0	1	0	0	0	0	0
Sleetmute	38	27	18	3	35	0	189	73	3	0
Stony River	20	12	3	2	5	0	180	105	5	0
Lime Village	15	0	-	-	-	-	-	-	-	-
McGrath	149	52	34	2	87	0	300	315	225	0
Takotna	25	0	-	-	-	-	-	-	-	-
Nikolai	32	27	21	3	62	0	60	0	50	0
Telida	2	0	-	-	-	-	-	-	-	-
Upper Kuskokwim	336	149	92	12	231	0	799	493	283	0
Kuskokwim River total	4,123	1,553	863	58	2,179	137	3,423	2,495	481	33
Quinhagak	151	66	31	1	41	10	10	10	10	0
Goodnews Bay	66	26	15	1	30	4	5	4	200	0
Platinum	17	12	8	0	12	0	0	0	0	0
S. Kuskokwim Bay	234	104	54	2	83	14	15	14	210	0
Mekoryuk	62	0	-	-	-	-	-	-	-	-
Newtok	79	0	-	-	-	-	-	-	-	-
Nightmute	55	0	-	-	-	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-	-	-	-
Tununak	61	0	-	-	-	-	-	-	-	-
Chefornak	82	0	-	-	-	-	-	-	-	-
Bering Sea Coast	453	0	-	-	-	-	-	-	-	-
Total	4,812	1,657	917	60	2,262	151	3,438	2,509	691	33

Note: '*N*' is the total number of households, '*n*' is the number of households answering the question about dogs. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. 'numdogs' is the reported number of dogs.

APPENDIX E: SALMON HARVEST LOST

Appendix E1.–Number of fish, by species reported as 'lost' due to spoilage, animals, etc., Kuskokwim area, 2008

Community	*N*	*n*	Chinook	Chum	Coho	Sockeye
Kipnuk	128	0	-	-	-	-
Kwigillingok	71	0	-	-	-	-
Kongiganak	83	23	0	0	0	0
N. Kuskokwim Bay	282	23	0	0	0	0
Tuntutuliak	92	0	-	-	-	-
Eek	85	0	-	-	-	-
Kasigluk	98	30	0	0	0	0
Nunapitchuk	111	0	-	-	-	-
Atmautluak	66	0	-	-	-	-
Napakiak	90	33	0	0	0	0
Napaskiak	101	30	0	0	0	0
Oscarville	19	8	0	0	0	0
Bethel	1,981	361	112	20	20	137
Kwethluk	156	33	10	0	0	0
Akiachak	148	36	0	0	0	0
Akiak	75	25	23	17	12	27
Tuluksak	78	24	8	15	8	0
Lower Kuskokwim	3,100	580	153	52	40	164
Lower Kalskag	89	17	0	0	0	0
Upper Kalskag	52	20	0	0	0	0
Aniak	177	89	7	110	0	2
Chuathbaluk	38	12	0	0	0	0
Upper Kuskokwim	356	138	7	110	0	2
Crooked Creek	39	17	13	13	1	13
Red Devil	18	7	4	10	30	10
Sleetmute	31	13	30	30	30	30
Stony River	19	9	0	10	30	0
Lime Village	12	0	-	-	-	-
McGrath	119	25	0	0	0	0
Takotna	25	0	-	-	-	-
Nikolai	27	15	0	0	0	0
Telida	2	0	-	-	-	-
Upper Kuskokwim	292	86	47	63	91	53
Kuskokwim River total	4,030	827	207	225	131	219
Quinhagak	172	45	19	4	8	8
Goodnews Bay	69	20	7	10	35	60
Platinum	17	10	0	0	0	0
S. Kuskokwim Bay	258	75	26	14	43	68
Mekoryuk	63	0	-	-	-	-
Newtok	79	0	-	-	-	-
Nightmute	50	0	-	-	-	-
Toksook Bay	114	0	-	-	-	-
Tununak	61	0	-	-	-	-
Chefornak	79	0	-	-	-	-
Bering Sea Coast	446	0	-	-	-	-
Total	4,736	902	233	239	174	287

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about lost fish. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix E2.–Number of fish, by species reported as 'lost' due to spoilage, animals, etc., Kuskokwim area, 2009.

Community	*N*	*n*	Chinook	Chum	Coho	Sockeye
Kipnuk	148	0	-	-	-	-
Kwigillingok	71	0	-	-	-	-
Kongiganak	92	36	2	2	5	3
N. Kuskokwim Bay	311	36	2	2	5	3
Tuntutuliak	82	31	2	0	0	0
Eek	77	34	1	0	0	0
Kasigluk	95	43	4	0	0	0
Nunapitchuk	114	43	0	0	0	0
Atmautluak	67	31	0	0	0	0
Napakiak	100	41	0	0	0	0
Napaskiak	98	42	49	3	2	3
Oscarville	17	10	10	0	0	0
Bethel	2,005	694	59	15	43	19
Kwethluk	157	57	32	30	15	14
Akiachak	141	55	35	0	0	0
Akiak	80	36	25	0	0	20
Tuluksak	86	35	14	24	0	23
Lower Kuskokwim	3,119	1,152	231	72	60	79
Lower Kalskag	71	26	1	0	0	0
Upper Kalskag	66	30	0	0	0	0
Aniak	183	167	27	4	12	2
Chuathbaluk	37	24	0	8	0	0
Upper Kuskokwim	357	247	28	12	12	2
Crooked Creek	41	28	5	2	0	5
Red Devil	14	5	23	0	0	0
Sleetmute	38	28	5	0	0	0
Stony River	20	12	313	418	416	463
Lime Village	15	0	-	-	-	-
McGrath	149	58	0	0	2	0
Takotna	25	0	-	-	-	-
Nikolai	32	27	0	0	0	0
Telida	2	0	-	-	-	-
Upper Kuskokwim	336	158	346	420	418	468
Kuskokwim River total	4,123	1,593	607	506	495	552
Quinhagak	151	73	10	10	20	45
Goodnews Bay	66	26	0	0	0	0
Platinum	17	13	0	0	0	0
S. Kuskokwim Bay	234	112	10	10	20	45
Mekoryuk	62	0	-	-	-	-
Newtok	79	0	-	-	-	-
Nightmute	55	0	-	-	-	-
Toksook Bay	114	0	-	-	-	-
Tununak	61	0	-	-	-	-
Chefornak	82	0	-	-	-	-
Bering Sea Coast	453	0	-	-	-	-
Total	4,812	1,705	617	516	515	597

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about lost fish. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

APPENDIX F: SURVEY RESULTS FOR “NEEDS MET”

Appendix F1.–Perception of people that subsistence fished, what percentage of their household's Chinook salmon subsistence needs were met this year , Kuskokwim area, 2008.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	128	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	83	15	20%	33%	13%	33%
N. Kuskokwim Bay	277	15	20%	33%	13%	33%
Tuntutuliak	92	-	-	-	-	-
Eek	85	-	-	-	-	-
Kasigluk	98	20	10%	15%	30%	45%
Nunapitchuk	111	-	-	-	-	-
Atmautluak	66	-	-	-	-	-
Napakiak	90	18	0%	39%	39%	22%
Napaskiak	101	17	0%	0%	82%	18%
Oscarville	19	7	14%	0%	57%	29%
Bethel	1,981	178	6%	11%	15%	69%
Kwethluk	156	24	21%	17%	42%	21%
Akiachak	148	27	0%	15%	41%	44%
Akiak	75	17	12%	6%	24%	59%
Tuluksak	78	19	21%	11%	47%	21%
Lower Kuskokwim	2,795	327	7%	13%	28%	52%
Lower Kalskag	89	8	0%	25%	75%	0%
Upper Kalskag	52	12	17%	42%	17%	25%
Aniak	177	62	19%	15%	16%	50%
Chuathbaluk	38	7	0%	29%	71%	0%
Middle Kuskokwim	312	89	16%	20%	26%	38%
Crooked Creek	39	8	63%	13%	0%	25%
Red Devil	18	6	33%	17%	33%	17%
Sleetmute	31	6	0%	67%	33%	0%
Stony River	19	5	40%	20%	20%	20%
Lime Village	12	-	-	-	-	-
McGrath	119	6	67%	0%	0%	33%
Takotna	25	-	-	-	-	-
Nikolai	27	9	44%	22%	0%	33%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	40	43%	23%	13%	23%
Kuskokwim River Total	3,639	471	12%	15%	26%	46%
Quinhagak	172	25	12%	16%	44%	28%
Goodnews Bay	69	10	0%	20%	40%	40%
Platinum	17	4	25%	25%	50%	0%
S. Kuskokwim Bay	235	39	10%	18%	44%	28%
Mekoryuk	63	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	50	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	79	-	-	-	-	-
Bering Sea Coast	446	-	-	-	-	-
Total	4,320	510	12%	16%	27%	45%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix F2.–Perception of people that subsistence fished, what percentage of their household's chum salmon subsistence needs were met this year , Kuskokwim area, 2008.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	128	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	83	14	14%	29%	29%	29%
N. Kuskokwim Bay	277	14	14%	29%	29%	29%
Tuntutuliak	92	-	-	-	-	-
Eek	85	-	-	-	-	-
Kasigluk	98	19	11%	16%	32%	42%
Nunapitchuk	111	-	-	-	-	-
Atmautluak	66	-	-	-	-	-
Napakiak	90	16	6%	25%	50%	19%
Napaskiak	101	17	0%	0%	82%	18%
Oscarville	19	7	0%	29%	43%	29%
Bethel	1,981	133	8%	13%	9%	71%
Kwethluk	156	23	13%	22%	39%	26%
Akiachak	148	25	0%	20%	44%	36%
Akiak	75	13	15%	8%	15%	62%
Tuluksak	78	19	16%	11%	42%	32%
Lower Kuskokwim	2,795	272	8%	14%	27%	51%
Lower Kalskag	89	7	0%	29%	71%	0%
Upper Kalskag	52	8	0%	50%	25%	25%
Aniak	177	36	14%	14%	25%	47%
Chuathbaluk	38	6	0%	33%	67%	0%
Middle Kuskokwim	312	57	9%	23%	35%	33%
Crooked Creek	39	7	29%	14%	14%	43%
Red Devil	18	3	67%	0%	0%	33%
Sleetmute	31	6	0%	50%	50%	0%
Stony River	19	5	40%	20%	20%	20%
Lime Village	12	-	-	-	-	-
McGrath	119	3	67%	0%	0%	33%
Takotna	25	-	-	-	-	-
Nikolai	27	3	33%	67%	0%	0%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	27	33%	26%	19%	22%
Kuskokwim River Total	3,639	370	10%	17%	28%	45%
Quinhagak	172	22	0%	23%	41%	36%
Goodnews Bay	69	9	0%	11%	44%	44%
Platinum	17	3	0%	33%	67%	0%
S. Kuskokwim Bay	235	34	0%	21%	44%	35%
Mekoryuk	63	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	50	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	79	-	-	-	-	-
Bering Sea Coast	446	-	-	-	-	-
Total	4,320	404	9%	17%	29%	45%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix F3.–Perception of people that subsistence fished, what percentage of their household's sockeye salmon subsistence needs were met this year , Kuskokwim area, 2008.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	128	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	83	15	20%	33%	20%	27%
N. Kuskokwim Bay	277	15	20%	33%	20%	27%
Tuntutuliak	92	-	-	-	-	-
Eek	85	-	-	-	-	-
Kasigluk	98	19	11%	16%	32%	42%
Nunapitchuk	111	-	-	-	-	-
Atmautluak	66	-	-	-	-	-
Napakiak	90	16	6%	31%	44%	19%
Napaskiak	101	17	0%	0%	82%	18%
Oscarville	19	7	29%	14%	29%	29%
Bethel	1,981	164	7%	12%	12%	70%
Kwethluk	156	22	18%	18%	45%	18%
Akiachak	148	25	0%	20%	36%	44%
Akiak	75	14	14%	7%	14%	64%
Tuluksak	78	18	17%	17%	33%	33%
Lower Kuskokwim	2,795	302	8%	14%	25%	53%
Lower Kalskag	89	7	0%	29%	71%	0%
Upper Kalskag	52	10	20%	40%	10%	30%
Aniak	177	51	16%	14%	20%	51%
Chuathbaluk	38	7	0%	29%	71%	0%
Middle Kuskokwim	312	75	13%	20%	28%	39%
Crooked Creek	39	8	50%	13%	0%	38%
Red Devil	18	6	33%	0%	17%	50%
Sleetmute	31	8	0%	63%	38%	0%
Stony River	19	5	20%	40%	20%	20%
Lime Village	12	-	-	-	-	-
McGrath	119	5	40%	0%	20%	40%
Takotna	25	-	-	-	-	-
Nikolai	27	1	0%	100%	0%	0%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	33	27%	27%	18%	27%
Kuskokwim River Total	3,639	425	11%	17%	25%	48%
Quinhagak	172	24	4%	25%	42%	29%
Goodnews Bay	69	12	0%	8%	50%	42%
Platinum	17	4	0%	25%	75%	0%
S. Kuskokwim Bay	235	40	3%	20%	48%	30%
Mekoryuk	63	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	50	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	79	-	-	-	-	-
Bering Sea Coast	446	-	-	-	-	-
Total	4,320	465	10%	17%	27%	46%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix F4.–Perception of people that subsistence fished, what percentage of their household's coho salmon subsistence needs were met this year , Kuskokwim area, 2008.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	128	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	83	10	20%	30%	30%	20%
N. Kuskokwim Bay	277	10	20%	30%	30%	20%
Tuntutuliak	92	-	-	-	-	-
Eek	85	-	-	-	-	-
Kasigluk	98	10	20%	20%	30%	30%
Nunapitchuk	111	-	-	-	-	-
Atmautluak	66	-	-	-	-	-
Napakiak	90	15	0%	27%	53%	20%
Napaskiak	101	13	0%	8%	77%	15%
Oscarville	19	3	0%	0%	33%	67%
Bethel	1,981	151	7%	11%	11%	72%
Kwethluk	156	15	20%	13%	40%	27%
Akiachak	148	19	5%	5%	47%	42%
Akiak	75	9	11%	11%	33%	44%
Tuluksak	78	15	20%	20%	33%	27%
Lower Kuskokwim	2,795	250	8%	12%	24%	55%
Lower Kalskag	89	3	0%	33%	67%	0%
Upper Kalskag	52	8	0%	25%	13%	63%
Aniak	177	58	10%	21%	21%	48%
Chuathbaluk	38	7	0%	29%	71%	0%
Middle Kuskokwim	312	76	8%	22%	26%	43%
Crooked Creek	39	10	50%	10%	10%	30%
Red Devil	18	5	60%	0%	0%	40%
Sleetmute	31	5	0%	80%	20%	0%
Stony River	19	5	60%	0%	20%	20%
Lime Village	12	-	-	-	-	-
McGrath	119	3	100%	0%	0%	0%
Takotna	25	-	-	-	-	-
Nikolai	27	4	25%	50%	0%	25%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	32	47%	22%	9%	22%
Kuskokwim River Total	3,639	368	12%	15%	24%	49%
Quinhagak	172	21	0%	14%	38%	48%
Goodnews Bay	69	9	0%	0%	44%	56%
Platinum	17	4	0%	50%	25%	25%
S. Kuskokwim Bay	235	34	0%	15%	38%	47%
Mekoryuk	63	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	50	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	79	-	-	-	-	-
Bering Sea Coast	446	-	-	-	-	-
Total	4,320	402	11%	15%	25%	49%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix F5.–Estimated percentage of Chinook salmon subsistence needs met, for households that subsistence fished, Kuskokwim area, 2009.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	148	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	92	21	10%	24%	5%	62%
N. Kuskokwim Bay	297	21	10%	24%	5%	62%
Tuntutuliak	82	23	0%	13%	0%	87%
Eek	77	22	9%	5%	0%	86%
Kasigluk	95	28	11%	11%	11%	68%
Nunapitchuk	114	25	16%	8%	4%	72%
Atmautluak	67	17	0%	6%	0%	94%
Napakiak	100	23	17%	9%	4%	70%
Napaskiak	98	31	0%	0%	3%	97%
Oscarville	17	8	13%	13%	13%	63%
Bethel	2,005	264	6%	6%	8%	79%
Kwethluk	157	47	11%	6%	11%	72%
Akiachak	141	42	10%	2%	10%	79%
Akiak	80	26	12%	12%	8%	69%
Tuluksak	86	21	5%	10%	10%	76%
Lower Kuskokwim	2,616	577	8%	7%	7%	79%
Lower Kalskag	71	15	20%	7%	13%	60%
Upper Kalskag	66	19	0%	11%	5%	84%
Aniak	183	89	36%	13%	11%	39%
Chuathbaluk	37	15	0%	27%	0%	73%
Middle Kuskokwim	271	138	25%	14%	9%	51%
Crooked Creek	41	11	0%	9%	9%	82%
Red Devil	14	3	0%	0%	33%	67%
Sleetmute	38	16	13%	13%	6%	69%
Stony River	20	6	17%	0%	0%	83%
Lime Village	15	-	-	-	-	-
McGrath	149	13	31%	0%	0%	69%
Takotna	25	-	-	-	-	-
Nikolai	32	14	14%	7%	0%	79%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	63	14%	6%	5%	75%
Kuskokwim River Total	3,439	799	11%	8%	7%	73%
Quinhagak	151	42	7%	12%	7%	74%
Goodnews Bay	66	14	21%	7%	0%	71%
Platinum	17	7	29%	29%	0%	43%
S. Kuskokwim Bay	193	63	13%	13%	5%	70%
Mekoryuk	62	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	55	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	82	-	-	-	-	-
Bering Sea Coast	453	-	-	-	-	-
Total	4,085	862	11%	9%	7%	73%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Percentage is estimated by dividing the total number of fish harvested by the total respondents said were 'needed'.

Appendix F6.–Estimated percentage of chum salmon subsistence needs met, for households that subsistence fished, Kuskokwim area, 2009.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	148	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	92	19	16%	11%	5%	68%
N. Kuskokwim Bay	297	19	16%	11%	5%	68%
Tuntutuliak	82	20	5%	5%	0%	90%
Eek	77	14	7%	7%	0%	86%
Kasigluk	95	24	8%	8%	13%	71%
Nunapitchuk	114	23	9%	4%	13%	74%
Atmautluak	67	14	7%	0%	0%	93%
Napakiak	100	20	20%	10%	0%	70%
Napaskiak	98	25	0%	0%	4%	96%
Oscarville	17	7	0%	14%	14%	71%
Bethel	2,005	158	9%	7%	9%	74%
Kwethluk	157	40	8%	13%	10%	70%
Akiachak	141	37	16%	3%	3%	78%
Akiak	80	23	22%	9%	0%	70%
Tuluksak	86	18	17%	6%	6%	72%
Lower Kuskokwim	2,616	423	10%	7%	7%	76%
Lower Kalskag	71	12	8%	17%	0%	75%
Upper Kalskag	66	14	14%	7%	0%	79%
Aniak	183	42	12%	19%	5%	64%
Chuathbaluk	37	15	7%	13%	0%	80%
Middle Kuskokwim	271	83	11%	16%	2%	71%
Crooked Creek	41	9	0%	11%	11%	78%
Red Devil	14	2	0%	0%	0%	100%
Sleetmute	38	9	0%	33%	0%	67%
Stony River	20	6	17%	0%	0%	83%
Lime Village	15	-	-	-	-	-
McGrath	149	5	0%	0%	0%	100%
Takotna	25	-	-	-	-	-
Nikolai	32	8	25%	13%	0%	63%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	39	8%	13%	3%	77%
Kuskokwim River Total	3,439	564	10%	9%	6%	75%
Quinhagak	151	36	8%	3%	0%	89%
Goodnews Bay	66	12	33%	8%	0%	58%
Platinum	17	4	50%	0%	0%	50%
S. Kuskokwim Bay	193	52	17%	4%	0%	79%
Mekoryuk	62	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	55	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	82	-	-	-	-	-
Bering Sea Coast	453	-	-	-	-	-
Total	4,085	616	11%	8%	5%	76%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Percentage is estimated by dividing the total number of fish harvested by the total respondents said were 'needed'.

Appendix F7.–Estimated percentage of sockeye salmon subsistence needs met, for households that subsistence fished, Kuskokwim area, 2009.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	148	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	92	19	21%	11%	5%	63%
N. Kuskokwim Bay	297	19	21%	11%	5%	63%
Tuntutuliak	82	21	10%	5%	0%	86%
Eek	77	17	12%	6%	0%	82%
Kasigluk	95	25	12%	20%	4%	64%
Nunapitchuk	114	25	12%	16%	0%	72%
Atmautluak	67	16	13%	6%	0%	81%
Napakiak	100	20	25%	5%	0%	70%
Napaskiak	98	30	0%	3%	0%	97%
Oscarville	17	7	14%	0%	29%	57%
Bethel	2,005	221	6%	17%	8%	69%
Kwethluk	157	41	12%	7%	7%	73%
Akiachak	141	35	11%	6%	6%	77%
Akiak	80	23	17%	4%	13%	65%
Tuluksak	86	20	5%	15%	15%	65%
Lower Kuskokwim	2,616	501	9%	12%	6%	73%
Lower Kalskag	71	14	21%	14%	7%	57%
Upper Kalskag	66	13	23%	8%	0%	69%
Aniak	183	73	44%	10%	4%	42%
Chuathbaluk	37	14	14%	7%	7%	71%
Middle Kuskokwim	271	114	35%	10%	4%	51%
Crooked Creek	41	9	11%	11%	11%	67%
Red Devil	14	3	0%	0%	0%	100%
Sleetmute	38	14	14%	21%	0%	64%
Stony River	20	6	17%	0%	0%	83%
Lime Village	15	-	-	-	-	-
McGrath	149	6	33%	17%	0%	50%
Takotna	25	-	-	-	-	-
Nikolai	32	1	0%	100%	0%	0%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	39	15%	15%	3%	67%
Kuskokwim River Total	3,439	673	14%	12%	6%	68%
Quinhagak	151	39	10%	5%	3%	82%
Goodnews Bay	66	13	31%	0%	8%	62%
Platinum	17	8	25%	0%	13%	63%
S. Kuskokwim Bay	193	60	17%	3%	5%	75%
Mekoryuk	62	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	55	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	82	-	-	-	-	-
Bering Sea Coast	453	-	-	-	-	-
Total	4,085	733	14%	11%	6%	69%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Percentage is estimated by dividing the total number of fish harvested by the total respondents said were 'needed'.

Appendix F8.–Estimated percentage of coho salmon subsistence needs met, for households that subsistence fished, Kuskokwim area, 2009.

Community	*N*	*n*	25% needs met	50% needs met	75% needs met	100% needs met
Kipnuk	148	-	-	-	-	-
Kwigillingok	71	-	-	-	-	-
Kongiganak	92	14	14%	14%	7%	64%
N. Kuskokwim Bay	297	14	14%	14%	7%	64%
Tuntutuliak	82	8	25%	0%	0%	75%
Eek	77	7	0%	14%	0%	86%
Kasigluk	95	14	7%	7%	14%	71%
Nunapitchuk	114	11	55%	0%	0%	45%
Atmautluak	67	5	20%	0%	0%	80%
Napakiak	100	18	28%	6%	6%	61%
Napaskiak	98	17	0%	0%	0%	100%
Oscarville	17	5	20%	20%	0%	60%
Bethel	2005	193	15%	5%	8%	73%
Kwethluk	157	32	25%	13%	0%	63%
Akiachak	141	24	21%	0%	4%	75%
Akiak	80	16	19%	6%	13%	63%
Tuluksak	86	15	20%	13%	7%	60%
Lower Kuskokwim	2616	365	17%	6%	6%	71%
Lower Kalskag	71	8	63%	0%	13%	25%
Upper Kalskag	66	7	14%	43%	0%	43%
Aniak	183	87	14%	18%	6%	62%
Chuathbaluk	37	6	17%	0%	0%	83%
Middle Kuskokwim	271	108	18%	18%	6%	59%
Crooked Creek	41	10	0%	30%	0%	70%
Red Devil	14	2	0%	0%	0%	100%
Sleetmute	38	14	7%	7%	7%	79%
Stony River	20	4	0%	0%	0%	100%
Lime Village	15	-	-	-	-	-
McGrath	149	12	8%	8%	17%	67%
Takotna	25	-	-	-	-	-
Nikolai	32	7	14%	14%	0%	71%
Telida	2	-	-	-	-	-
Upper Kuskokwim	255	49	6%	12%	6%	76%
Kuskokwim River Total	3439	536	16%	9%	6%	69%
Quinhagak	151	33	12%	6%	0%	82%
Goodnews Bay	66	11	9%	18%	0%	73%
Platinum	17	4	25%	25%	0%	50%
S. Kuskokwim Bay	193	48	13%	10%	0%	77%
Mekoryuk	62	-	-	-	-	-
Newtok	79	-	-	-	-	-
Nightmute	55	-	-	-	-	-
Toksook Bay	114	-	-	-	-	-
Tununak	61	-	-	-	-	-
Chefornak	82	-	-	-	-	-
Bering Sea Coast	453	-	-	-	-	-
Total	4085	584	16%	9%	5%	70%

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question about their subsistence needs. Kuskokwim River Total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes. Percentage is estimated by dividing the total number of fish harvested by the total respondents said were 'needed'.

Appendix F9.–The estimated number of salmon needed for subsistence compared to the estimated number of salmon harvested for subsistence, by species and by subregion, Kuskokwim area, 2009.

	Number of Salmon							
	Chinook		Chum		Sockeye		Coho	
	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate
N. Kuskokwim Bay								
Needed	1,631	3,183	1,276	3,052	1,051	2,191	567	1,843
Harvested	758	1,478	724	1,846	470	1,146	375	845
Lower Kuskokwim								
Needed	91,381	102,011	48,555	57,963	41,682	48,278	31,516	41,798
Harvested	62,826	71,572	30,692	37,694	24,590	29,080	18,744	27,400
Middle Kuskokwim								
Needed	12,049	15,197	6,432	9,692	5,300	8,714	4,680	6,620
Harvested	5,695	8,313	3,862	5,694	1,948	3,806	2,371	3,415
Upper Kuskokwim								
Needed	4,331	5,955	2,914	6,480	3,935	10,061	3,258	6,740
Harvested	2,508	3,832	2,082	4,874	3,219	6,061	2,165	4,801
S. Kuskokwim Bay								
Needed	4,480	6,502	1,561	2,493	3,875	6,053	2,293	3,731
Harvested	2,896	4,322	1,119	1,811	2,219	3,403	1,448	2,616
Bering Sea Coast								
Needed	-	-	-	-	-	-	-	-
Harvested	-	-	-	-	-	-	-	-
Total Kuskokwim Area								
Needed	117,615	129,105	64,827	75,591	60,602	70,538	45,927	57,121
Harvested	77,418	86,782	41,265	49,133	35,075	40,867	27,493	36,687

Appendix F10.–Number of responses (*n*) and proportion (%) of total responses for each response category for the question "if you did not meet your subsistence needs for Chinook salmon, why not?" by river region, Kuskokwim area, 2009.

	Reason for not meeting needs																	
River Region	Did not fish [a]		Personal [b]		Gas prices [c]		Salmon run dynamics [d]		Management [e]		Weather / river conditions [f]		Other [g]		Lost fish [h]		Total [i]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	7	21%	25	76%	0	0%	1	3%	0	0%	0	0%	0	0%	0	0%	33	100%
N. Kuskokwim Bay	1	9%	8	73%	0	0%	2	18%	0	0%	0	0%	0	0%	0	0%	11	100%
Lower Kuskokwim	82	29%	175	62%	11	4%	9	3%	0	0%	3	1%	4	1%	0	0%	284	100%
Middle Kuskokwim	1	1%	95	88%	4	4%	7	6%	0	0%	0	0%	1	1%	0	0%	108	100%
Upper Kuskokwim	6	13%	36	75%	2	4%	4	8%	0	0%	0	0%	0	0%	1	2%	48	100%
Total	97	20%	339	70%	17	4%	23	5%	0	0%	3	1%	5	1%	1	0%	484	100%

Note: If responses included two reasons for why a household did not meet its subsistence needs (e.g. "price of gas is high and full time job"). The first reason given was used for this analysis, unless the second reason given appeared to be the primary reason.

[a] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[b] The "Personal" category includes responses such as: busy, no time, working, no boat/gear, boat/gear problems, no freezer, new/just moved, fished wrong time, and gave fish to family.

[c] The "Gas prices" category includes responses such as: gas too expensive.

[d] The "Salmon run dynamics" category includes responses about salmon abundance , catchability, size, run timing, or quality of fish flesh.

[e] The Management" category includes responses such as: too many commercial openings, and too much sport fishing.

[f] The "Weather/river conditions" category includes responses such as: bad weather and low water.

[g] The "Other" category includes responses such as: test fish bin empty, and non-residents.

[h] The "Lost Fish" category includes responses such as: bears ate fish.

[i] A one percent rounding error may occur in the total percentage column.

Appendix F11.–Number of responses (*n*) and proportion (%) of total responses for each response category for the question "if you did not meet your subsistence needs for chum salmon, why not?" by river region, Kuskokwim area, 2009.

	Reason for not meeting needs																	
River Region	Did not fish [a]		Personal [b]		Gas prices [c]		Salmon run dynamics [d]		Management [e]		Weather / river conditions [f]		Other [g]		Lost fish [h]		Total [i]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	8	26%	22	71%	0	0%	1	3%	0	0%	0	0%	0	0%	1	3%	31	100%
N. Kuskokwim Bay	1	11%	8	89%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	9	100%
Lower Kuskokwim	90	31%	172	60%	14	5%	7	2%	1	0%	2	1%	1	0%	0	0%	287	100%
Middle Kuskokwim	1	2%	42	89%	2	4%	1	2%	0	0%	0	0%	1	2%	0	0%	47	100%
Upper Kuskokwim	10	20%	35	70%	2	4%	3	6%	0	0%	0	0%	0	0%	1	2%	50	100%
Total	110	26%	279	66%	18	4%	12	3%	1	0%	2	0%	2	0%	2	0%	424	100%

Note: If responses included two reasons for why a household did not meet its subsistence needs (e.g. "price of gas is high and full time job"). The first reason given was used for this analysis, unless the second reason given appeared to be the primary reason.

[a] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[b] The "Personal" category includes responses such as: busy, no time, working, no boat/gear, boat/gear problems, no freezer, new/just moved, fished wrong time, and gave fish to family.

[c] The "Gas prices" category includes responses such as: gas too expensive.

[d] The "Salmon run dynamics" category includes responses about salmon abundance , catchability, size, run timing, or quality of fish flesh.

[e] The Management" category includes responses such as: too many commercial openings, and too much sport fishing.

[f] The "Weather/river conditions" category includes responses such as: bad weather and low water.

[g] The "Other" category includes responses such as: test fish bin empty, and non-residents.

[h] The "Lost Fish" category includes responses such as: bears ate fish.

[i] A one percent rounding error may occur in the total percentage column.

Appendix F12.–Number of responses (*n*) and proportion (%) of total responses for each response category for the question "if you did not meet your subsistence needs for sockeye salmon, why not?" by river region, Kuskokwim area, 2009.

River Region	Reason for not meeting needs																	
	Did not fish [a]		Personal [b]		Gas prices [c]		Salmon run dynamics [d]		Management [e]		Weather / river conditions [f]		Other [g]		Lost fish [h]		Total [i]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	7	22%	24	75%	0	0%	1	3%	0	0%	0	0%	0	0%	0	0%	32	100%
N. Kuskokwim Bay	1	11%	8	89%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	9	100%
Lower Kuskokwim	79	29%	163	61%	11	4%	10	4%	0	0%	3	1%	3	1%	0	0%	269	100%
Middle Kuskokwim	0	0%	76	94%	0	0%	4	5%	0	0%	0	0%	1	1%	0	0%	81	100%
Upper Kuskokwim	6	12%	37	76%	2	4%	4	8%	0	0%	0	0%	0	0%	1	2%	49	100%
Total	93	21%	308	70%	13	3%	19	4%	0	0%	3	1%	4	1%	1	0%	440	100%

Note: If responses included two reasons for why a household did not meet its subsistence needs (e.g. "price of gas is high and full time job"). The first reason given was used for this analysis, unless the second reason given appeared to be the primary reason.

[a] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[b] The "Personal" category includes responses such as: busy, no time, working, no boat/gear, boat/gear problems, no freezer, new/just moved, fished wrong time, and gave fish to family.

[c] The "Gas prices" category includes responses such as: gas too expensive.

[d] The "Salmon run dynamics" category includes responses about salmon abundance , catchability, size, run timing, or quality of fish flesh.

[e] The Management" category includes responses such as: too many commercial openings, and too much sport fishing.

[f] The "Weather/river conditions" category includes responses such as: bad weather and low water.

[g] The "Other" category includes responses such as: test fish bin empty, and non-residents.

[h] The "Lost Fish" category includes responses such as: bears ate fish.

[i] A one percent rounding error may occur in the total percentage column.

Appendix F13.–Number of responses (*n*) and proportion (%) of total responses for each response category for the question "if you did not meet your subsistence needs for coho salmon, why not?" by river region, Kuskokwim area, 2009.

	Reason for not meeting needs																	
River Region	Did not fish [a]		Personal [b]		Gas prices [c]		Salmon run dynamics [d]		Management [e]		Weather / river conditions [f]		Other [g]		Lost fish [h]		Total [i]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	7	22%	24	75%	0	0%	1	3%	0	0%	0	0%	0	0%	0	0%	32	100%
N. Kuskokwim Bay	1	11%	8	89%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	9	100%
Lower Kuskokwim	77	29%	167	63%	12	4%	7	3%	0	0%	2	1%	2	1%	0	0%	267	100%
Middle Kuskokwim	2	2%	76	92%	1	1%	2	2%	0	0%	1	1%	1	1%	0	0%	83	100%
Upper Kuskokwim	5	10%	38	78%	2	4%	4	8%	0	0%	0	0%	0	0%	1	2%	49	100%
Total	92	21%	313	71%	15	3%	14	3%	0	0%	3	1%	3	1%	1	0%	440	100%

Note: If responses included two reasons for why a household did not meet its subsistence needs (e.g. "price of gas is high and full time job"). The first reason given was used for this analysis, unless the second reason given appeared to be the primary reason.

[a] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[b] The "Personal" category includes responses such as: busy, no time, working, no boat/gear, boat/gear problems, no freezer, new/just moved, fished wrong time, and gave fish to family.

[c] The "Gas prices" category includes responses such as: gas too expensive.

[d] The "Salmon run dynamics" category includes responses about salmon abundance , catchability, size, run timing, or quality of fish flesh.

[e] The Management" category includes responses such as: too many commercial openings, and too much sport fishing.

[f] The "Weather/river conditions" category includes responses such as: bad weather and low water.

[g] The "Other" category includes responses such as: test fish bin empty, and non-residents.

[h] The "Lost Fish" category includes responses such as: bears ate fish.

[i] A one percent rounding error may occur in the total percentage column.

APPENDIX G: COMMENTS FROM PARTICIPANTS

Appendix G1.–The number (*n*) and proportion (%) of the types of comments received from respondents during subsistence surveys when asked: "Do you have any additional comments for us?", Kuskokwim area, 2008.

River Region	Comment Categories																					
	Run dynamics positive [a]		Run dynamics negative [b]		Did not fish [c]		No need [d]		Personal [e]		Expenses [f]		Manage-ment [g]		Environ-ment [h]		Other [i]		Lost fish [j]		Total [k]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	16	38	4	10	10	24	1	2	6	14	0	0	2	5	0	0	3	7	0	0	42	100
N. Kuskokwim Bay	5	31	1	6	1	6	0	0	4	25	0	0	2	13	1	6	2	13	0	0	16	100
Lower Kuskokwim	32	8	16	4	276	67	1	0	36	9	5	1	6	1	3	1	35	9	1	0	411	100
Middle Kuskokwim	12	13	15	16	30	32	6	6	20	22	0	0	6	6	1	1	3	3	0	0	93	100
Upper Kuskokwim	10	13	10	13	27	34	3	4	8	10	0	0	12	15	1	1	7	9	1	1	79	100
Total	75	12	46	7	344	54	11	2	74	12	5	1	28	4	6	1	50	8	2	0	641	100

Note: A small number of responses included more than one comment (e.g. "price of gas is high and full time job"). The first comment given was used for this analysis, unless the second comment appeared to be the primary comment.

[a] The "Run dynamics positive" category includes responses such as: fishing was good, caught enough, average, ok, and more than last year.

[b] "Run dynamics negative" category includes responses such as: fishing was slow, not as many fish this year, fish were smaller, fish were late, and diseased fish.

[c] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[d] The "No need" category includes responses such as: does not eat salmon, allergic, fishes on the Yukon River, and still have fish from last year.

[e] The "Personal" category includes responses such as: busy, working, no boat, boat/gear problems, new/just moved, and fished wrong time.

[f] The "Expenses" category includes responses such as: gas prices too high, and groceries expensive.

[g] The "Management" category includes responses such as: more/or fewer commercial openings, too much sport fishing, concern about trawlers, concern about weirs, research questions, ADF&G comments, happy about not having subsistence closures, and fishing regulation questions.

[h] The "Environment" category includes responses such as: low water level, pollution, pike eating fry, concern about mines leeching chemicals, concerns about barge changing river channel, and good weather for drying fish.

[i] The "Other" category includes responses such as: commercial fishing prices and/or buyers, moose and bird hunting comments, non-salmon fish comments, fished in areas other than the Kuskokwim River, gave fish to dogs, gave fish to family, and fished with parents.

[j] The "Lost fish" category includes responses such as: bears ate fish.

[k] A one percent rounding error may occur in the total percentage column.

Appendix G2.–The number (*n*) and proportion (%) of the types of comments received from respondents during subsistence surveys when asked: "Do you have any additional comments for us?", Kuskokwim area, 2009.

River Region	Comment Categories																					
	Run dynamics postive[a]		Run dynamics negative[b]		Did not fish[c]		No need[d]		Personal[e]		Expenses[f]		Manage-ment[g]		Environ-ment[h]		Other[i]		Lost fish[j]		Total[k]	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
S. Kuskokwim Bay	0	0	0	0	6	27	3	14	1	5	0	0	6	27	3	14	3	14	0	0	22	100
N. Kuskokwim Bay	0	0	2	20	4	40	0	0	0	0	0	0	0	0	0	0	4	40	0	0	10	100
Lower Kuskokwim	81	34	15	6	15	6	8	3	12	5	1	0	34	14	10	4	63	26	2	1	241	100
Middle Kuskokwim	23	28	12	14	4	5	9	11	8	10	1	1	10	12	4	5	11	13	1	1	83	100
Upper Kuskokwim	0	0	6	24	4	16	1	4	1	4	1	4	7	28	0	0	5	20	0	0	25	100
Total	104	27	35	9	33	9	21	6	22	6	3	1	57	15	17	4	86	23	3	1	381	100

Note: A small number of responses included more than one comment (e.g. "price of gas is high and full time job"). The first comment given was used for this analysis, unless the second comment appeared to be the primary comment.

[a] The "Run dynamics positive" category includes responses such as: fishing was good, caught enough, average, ok, and more than last year.

[b] "Run dynamics negative" category includes responses such as: fishing was slow, not as many fish this year, fish were smaller, fish were late, and diseased fish.

[c] The "Did not fish" category includes responses such as: didn't fish, elder, and receives fish.

[d] The "No need" category includes responses such as: does not eat salmon, allergic, fishes on the Yukon River, and still have fish from last year.

[e] The "Personal" category includes responses such as: busy, working, no boat, boat/gear problems, new/just moved, and fished wrong time.

[f] The "Expenses" category includes responses such as: gas prices too high, and groceries expensive.

[g] The "Management" category includes responses such as: more/or fewer commercial openings, too much sport fishing, concern about trawlers, concern about weirs, research questions, ADF&G comments, happy about not having subsistence closures, and fishing regulation questions.

[h] The "Environment" category includes responses such as: low water level, pollution, pike eating fry, concern about mines leeching chemicals, concerns about barge changing river channel, and good weather for drying fish.

[i] The "Other" category includes responses such as: commercial fishing prices and/or buyers, moose and bird hunting comments, non-salmon fish comments, fished in areas other than the Kuskokwim River, gave fish to dogs, gave fish to family, and fished with parents.

[j] The "Lost fish" category includes responses such as: bears ate fish.

[k] A one percent rounding error may occur in the total percentage column.

APPENDIX H: SALMON RETAINED FROM COMMERCIAL HARVEST

Appendix H1.–Reported number of salmon retained from commercial harvest for subsistence use, Kuskokwim area, 2008.

Community	*N*	*n*	Chinook	Chum	Coho	Sockeye	Pink
Kipnuk	128	0	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-
Kongiganak	83	6	0	0	0	40	0
N. Kuskokwim Bay	282	6	0	0	0	40	0
Tuntutuliak	92	0	-	-	-	-	-
Eek	85	0	-	-	-	-	-
Kasigluk	98	5	0	0	12	0	0
Nunapitchuk	111	0	-	-	-	-	-
Atmautluak	66	0	-	-	-	-	-
Napakiak	90	8	50	1	21	0	0
Napaskiak	101	5	400	0	425	0	0
Oscarville	19	1	0	0	0	0	0
Bethel	1,981	33	17	15	23	20	0
Kwethluk	156	7	0	0	5	5	40
Akiachak	148	16	15	20	250	6	0
Akiak	75	2	3	0	12	0	0
Tuluksak	78	5	20	40	30	8	0
Lower Kuskokwim River	3,100	82	505	76	778	39	40
Lower Kalskag	89	0	0	0	0	0	0
Upper Kalskag	52	0	0	0	0	0	0
Aniak	177	2	0	0	0	0	0
Chuathbaluk	38	0	0	0	0	0	0
Middle Kuskokwim	356	2	0	0	0	0	0
Crooked Creek	39	0	0	0	0	0	0
Red Devil	18	0	0	0	0	0	0
Sleetmute	31	0	0	0	0	0	0
Stony River	19	0	0	0	0	0	0
Lime Village	12	0	-	-	-	-	-
McGrath	119	0	0	0	0	0	0
Takotna	25	0	-	-	-	-	-
Nikolai	27	0	0	0	0	0	0
Telida	2	0	-	-	-	-	-
Upper Kuskokwim	292	0	0	0	0	0	0
Kuskokwim River Total	4,030	90	505	76	778	79	40
Quinhagak	172	16	33	101	6	1	1
Goodnews Bay	69	5	0	5	0	5	0
Platinum	17	2	0	0	0	0	0
S. Kuskokim Bay	258	23	33	106	6	6	1
Mekoryuk	63	0	-	-	-	-	-
Newtok	79	0	-	-	-	-	-
Nightmute	50	0	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-
Tununak	61	0	-	-	-	-	-
Chefornak	79	0	-	-	-	-	-
Bering Sea Coast	446	0	-	-	-	-	-
Total	4,736	113	538	182	784	85	41

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question that they commercial fished. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

Appendix H2.–Reported number of salmon retained from commercial harvest for subsistence use, Kuskokwim area, 2009.

Community	*N*	*n*	Chinook	Chum	Coho	Sockeye	Pink
Kipnuk	148	0	-	-	-	-	-
Kwigillingok	71	0	-	-	-	-	-
Kongiganak	92	3	0	0	0	0	0
N. Kuskokwim Bay	311	3	0	0	0	0	0
Tuntutuliak	82	8	0	0	0	0	0
Eek	77	16	0	0	0	0	0
Kasigluk	95	8	0	0	22	0	0
Nunapitchuk	114	12	10	0	0	8	0
Atmautluak	67	4	0	0	0	0	0
Napakiak	100	10	0	2	14	0	0
Napaskiak	98	6	0	0	4	0	0
Oscarville	17	2	0	0	0	0	0
Bethel	2,005	28	1	0	1	6	0
Kwethluk	157	7	0	0	100	0	0
Akiachak	141	24	0	0	0	0	1
Akiak	80	3	0	0	0	0	0
Tuluksak	86	0	0	0	0	0	0
Lower Kuskokwim River	3,119	128	11	2	141	14	1
Lower Kalskag	71	0	0	0	0	0	0
Upper Kalskag	66	0	0	0	0	0	0
Aniak	183	3	8	1	25	4	0
Chuathbaluk	37	0	0	0	0	0	0
Middle Kuskokwim	357	3	8	1	25	4	0
Crooked Creek	41	0	0	0	0	0	0
Red Devil	14	0	0	0	0	0	0
Sleetmute	38	0	0	0	0	0	0
Stony River	20	0	0	0	0	0	0
Lime Village	15	0	-	-	-	-	-
McGrath	149	0	0	0	0	0	0
Takotna	25	0	-	-	-	-	-
Nikolai	32	0	0	0	0	0	0
Telida	2	0	-	-	-	-	-
Upper Kuskokwim	336	0	0	0	0	0	0
Kuskokwim River Total	4,123	134	19	3	166	18	1
Quinhagak	151	27	86	18	2	55	0
Goodnews Bay	66	9	6	0	5	11	0
Platinum	17	7	8	4	0	14	0
S. Kuskokim Bay	234	43	100	22	7	80	0
Mekoryuk	62	0	-	-	-	-	-
Newtok	79	0	-	-	-	-	-
Nightmute	55	0	-	-	-	-	-
Toksook Bay	114	0	-	-	-	-	-
Tununak	61	0	-	-	-	-	-
Chefornak	82	0	-	-	-	-	-
Bering Sea Coast	453	0	-	-	-	-	-
Total	4,812	177	119	25	173	98	1

Note: '*N*' is the total number of households, '*n*' is the number of households responding to the question that they commercial fished. Kuskokwim River total includes Lower, Middle, Upper Kuskokwim areas and North Kuskokwim Bay. Data is unavailable for cells with dashes.

APPENDIX I: FISH MEASURES: THE EQUIVALENCE OF PROCESSED SUBSISTENCE FOOD TO WHOLE FISH

Appendix I1.–Approximate measurements used to convert reported amounts of fish harvest, Kuskokwim area, 2008 to 2009.

Amounts	Description
Salmon	
1 king salmon = 5-8 lb. strips	dried and smoked king salmon
1 **gal.** Ziploc = 5 lb. Strips	dried and smoked king salmon
1 **qt.** Ziploc = 2 lb. Strips	dried and smoked king salmon
6 gal. Bucket = 4-5 kings	dried king salmon
5 gal. "poke fish" = 25-30 chum	dried chum in seal oil
30 gal. barrel = 150-180 chum	dried chum in seal oil
1 gal. Ziploc = 2-3 chum	dried chum filets
5 gal. bucket = 25 chum	chum filets, tightly packed
1 dried chum = 2/3 lb.	summer chum salmon for dog food
1 bundle = 50 dried chum	summer chum salmon for dog food
300 dog salmon/dog/winter	feeding summer chum to a dog team
1 dried chum = 1 1/4 to 1 1/3 lbs.	summer or fall chum
1 pink salmon = 3 lb.	pink salmon
Other fish	
1 small whitefish = 1 lb.	round whitefish, least, Bering, or arctic cisco, caught in whitefish net (4" or smaller mesh) or fish wheel
1 large whitefish = 4 lb.	broad or humpback whitefish, caught in chum net (5" or larger mesh) or fish wheel
125 smelt = 5 gal. bucket	
1 gunny sack = 50 to 100 lbs. (ask fisherman)	"tomcod", whitefish, herring
14 blackfish = 1 lb. **350 blackfish = 5 gal. bucket** = 25 lb.	blackfish
1 eel = 1/3 lb.	arctic lamprey

APPENDIX J: EVALUATION AND COMPARISON OF FISHERIES SURVEY PROCEDURES

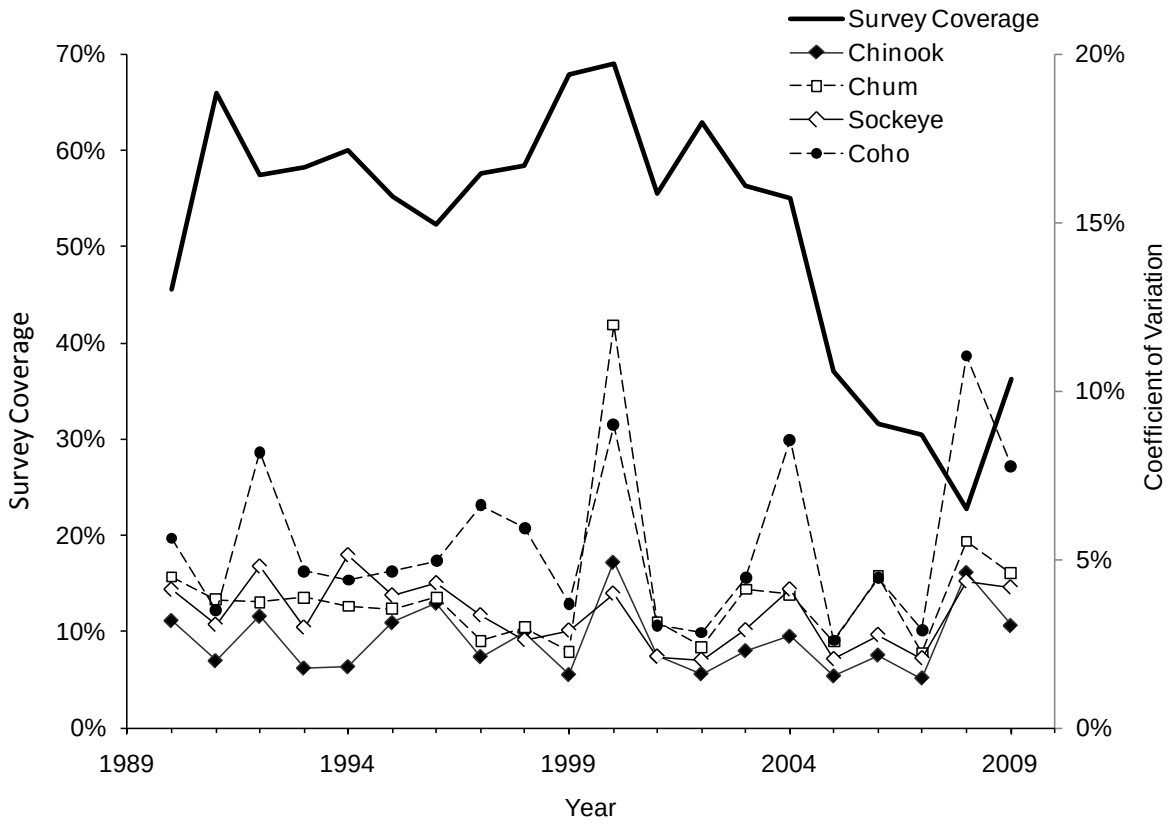
Appendix J1.–Evaluation and comparison of ADF&G Division of Commercial Fisheries survey methods and ADF&G Division of Subsistence survey methods.

Upon transfer of the Kuskokwim subsistence harvest survey from the ADF&G Division of Subsistence (ADF&G SD) to ADF&G Division of Commercial Fisheries (ADF&G CF) in 2008, the ADF&G CF revised sampling survey procedures as described in the Methods section of this report. (See Hamazaki 2011 Appendix A for detailed description of the ADF&G SD household survey methodology used prior to 2008). The major changes were: (1) formal adoption of stratified random sampling survey method, in which survey households are randomly pre-selected before the survey; and (2) change of sampling coverage objective from 100% census to 100% survey for "unknown", 30% for "usually do not fish", and 50% for "usually fish" strata. This change has reduced the total survey coverage from 50-60% in 1999-2004 to 25-40% in 2008-2009, which also raised questions as to whether the revised methods may have changed the survey accuracies. (Total survey coverage for this analysis is the number of houses surveyed divided by the total of all known households in the Kuskokwim area, including those communities that did not participate in the survey such as the Bering Sea Coast communities, Kwigillingok and Kipnuk of North Kuskokwim Bay).

To address this concern, we compared recent five-year (2003-2007) averages for numbers of fish harvested per household, as estimated by ADF&G SD, with household harvests for 2008 and 2009, as estimated by ADF&G CF (Table 1). If accuracy of the ADF&G CF estimates differed from that of ADF&G SD estimates, we would expect that ADF&G CF estimate would be outside the 95% confidence interval of the ADF&G SD. Further, we examined coefficients of variation (CV) for the ADF&G SD and ADF&G CF estimates (Figure 1). If the ADF&G CF survey coverage was too low, we would expect that CV of the ADF&G CF estimate would be higher than that of the ADF&G SD.

Appendix J1–Table 1: Mean household harvest in the Kuskokwim River drainage for the period 2003-2007, with standard deviation and 95% confidence interval range, compared with mean household (HH) harvests for 2008 and 2009.

	ADF&G SD (2003-2007) HH harvest			**ADF&G CF Mean HH harvest**	
Species	**Mean**	**SD**	**95% range**	**2008**	**2009**
Chinook	22.5	2.8	16.9-28.1	24.3	19.0
Chum	16.9	4.4	8.1-25.7	16.6	10.4
Sockeye	10.6	1.3	8.1-13.1	14.6	8.5
Coho	10.0	1.6	7.8-13.2	11.5	7.2



Appendix J1–Figure 1: Historical survey coverage and coefficient of variation of Kuskokwim area subsistence salmon harvest estimates.

From 1990 to 2004, coverage of the ADF&G SD surveys was maintained at greater than 50%; however, during 2005-2007 it dropped to 30% (Figure 1) due to budget constraints (Simon et al 2007). In 2008, household coverage in the Commercial Fisheries Division surveys dropped to the lowest (23%) for the time series, but increased to 36% in 2009. Comparing the number of fish harvested per household for 2008 and 2009 with those of 2003-2007, these were within historical 95% confidence interval range, except for sockeye in 2008 and coho in 2009 (Table 1). CV of 2008 and 2009 estimates for all salmon species were less than 6%, except for coho (11% in 2008, 7.8% in 2009; Figure 1).

The above results show that harvest estimates and precision of the revised ADF&G CF survey protocols are comparable to those of the ADF&G SD. This also suggests that the survey coverage of 25-40% is sufficient for accurate and precise estimation of the Kuskokwim subsistence salmon harvests.